DOCUMENT RESUME

ED 325 693 CE 056 275

AUTHOR	Davis, Diane, Ed.
TITLE	Criterion-Referenced Test Items for Welding.
INSTITUTION	Missouri Univ., Columbia. Instructional Materials Lab.
SPONS AGENCY	Missouri State Dept. of Elementary and Secondary Education, Jefferson City. Div. of Vocational and Adult Education.
PUB DATE	90
NOTE	236p.
AVAILABLE FROM	Instructional Materials Laboratory, University of Missouri, 2316 Industrial Drive, Columbia, MO 65202 (order no. 70-6300-E: $18.45).
PUB TYPE	Tests/Evaluation Instruments (160)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Behavioral Objectives; *Competence; *Competency Based Education; Construction (Process); *Criterion Referenced Tests; Entry Workers; Job Skills; *Metal Working; Postsecondary Education; Secondary Education; *Test Items; *Welding
IDENTIFIERS	Missouri

ABSTRACT

This test item bank on welding contains test questions based upon competencies found in the Missouri Welding Competency Profile. Some test items are keyed for multiple competencies. These criterion-referenced test items are designed to work with the Vocational Instructional Management System. Questions have been statistically sampled and validated on students at Vocational Industrial Clubs of America district contests. The tests cover the following 13 competency areas in welding: basic skills; print reading; oxy-fuel cutting/welding; layout and fit-up; shielded metal arc--general; shielded metal arc--3/8-inch plate; shielded metal arc--pipe (2 inch to 6-inch diameter); shielded metal arc--16 gauge steel; gas metal arc welding--plate, pipe (stainless steel, aluminum and carbon steel); gas tungsten-arc welding (carbon steel, stainless steel, aluminum); plasma cutting; metallurgy and heat treating; and carbon-arc cutting. A list of the 16 references used to create the test items is included. (KC)

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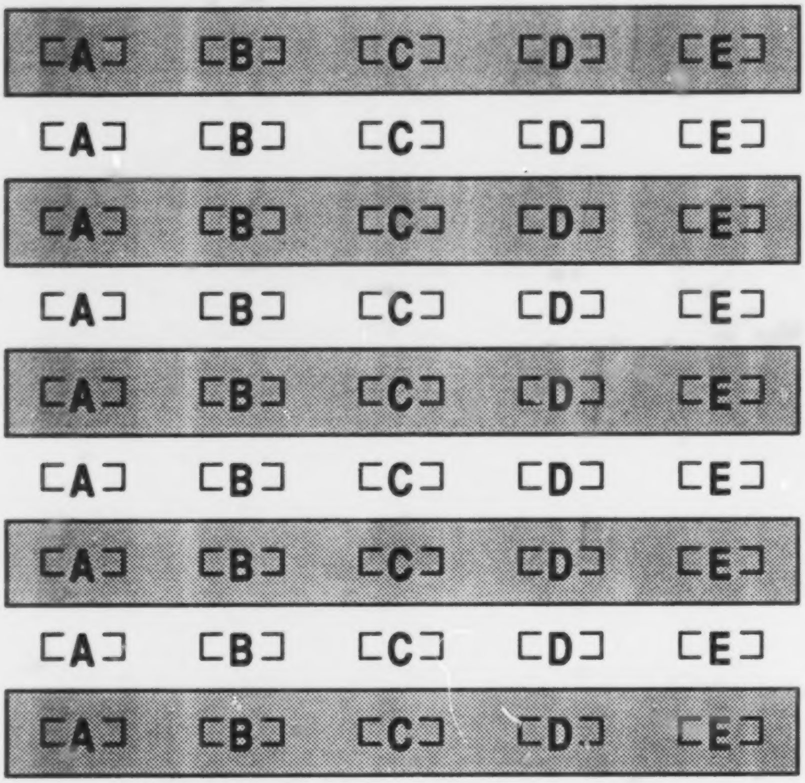

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Criterion-Referenced Test Items
for
WELDING

INSTRUCTIONAL MATERIALS LABORATORY
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CE 056 275

Criterion-Referenced Test (CRT) Items for
WELDING

Diane Davis, editor/project coordinator
Instructional Materials Laboratory
8 London Hall
University of Missouri-Columbia
Columbia, MO 65211

Catalog No. 70-6300-E
1990

DEDICATION

This test item bank is dedicated to teachers like **Harry Batz** of New Madrid who show every day how much they care about their students. In addition to teaching welding at New Madrid Co. AVTS, Harry contributed to welding curriculum development by writing part of the test items in this bank and field-testing the Welding curriculum guide developed for Missouri in 1988. He will be missed by many.

The activity which is the subject of this report was supported in whole or in part by funds from the Department of Elementary and Secondary Education, Division of Vocational and Adult Education. However, the opinions expressed herein do not necessarily reflect the position or policies of the Missouri Department of Elementary and Secondary Education or the Division of Vocational and Adult Education, and no official endorsement should be inferred.

FOREWORD

Rapid advances in technology are placing heavy demands on both teachers and students in vocational education. These Criterion-Referenced Test Items for Welding are designed to help meet those demands.

All test writers face one basic challenge: to produce test items that accurately measure what they are intended to measure. This challenge was kept firmly in mind by all those who participated in the development of the bank. The items in the bank are based upon competencies found on the Missouri Welding Competency Profile. Much care was taken to ensure that the test items will accurately measure a student's knowledge in regard to these competencies. Every effort was made to ensure the items are presented in a fair and unbiased matter.

The items in this book are designed to work with both the Vocational Instructional Management System (VIMS) and VAMS. The test item bank will allow instructors and administrators to manage testing and evaluation activities in the most efficient way possible. Instructors pulling items from this bank for individual tests should still evaluate the new test to see that one question does not give away the answer to another question. For word processing and test-item generation purposes, an ASCII disk of the item bank has been included with this printed copy.

There are several unique aspects to this welding test-item bank. Since some competencies have the same underlying knowledge base, some test items have been keyed for multiple competencies. On the advisory committee's suggestion, a sample statistical analysis was done using 200 of the items and students at VICA district contests. This additional step exceeded the requirements of the original DESE proposal and was a good testing ground for possible future verification of test items.

This test bank should be viewed as a beginning. It is hoped that future revisions and additions will build the bank into an even more powerful and reliable evaluation and management tool.

Judith Moore, supervisor
Industrial Education
Department of Elementary and Secondary Education

Charles "Chuck" Waibel, director
Industrial Education
Department of Elementary and Secondary Education

ACKNOWLEDGMENTS

These Criterion-Referenced Test (CRT) Items for Welding represent a continuing commitment to Missouri's Vocational Instructional Management System (VIMS). The bank is keyed to the Welding Competency Profile developed by industry and education professionals in the state. The cycle of curriculum development includes the following steps:

1. Development of the competency profile
2. Instructional analysis
3. Search for existing materials and/or a crosswalk of existing curriculum materials to the competency profile
4. Development of the curriculum guide
5. Field-test of the curriculum guide
6. Development of mediated curriculum (videos)
7. Development of the test-item bank

To ensure that test items are firmly based on information available to students, development of the test-item bank is the final component in the development cycle.

These teachers contributed as writers and advisory committee members.

Harry Batz, New Madrid Co. AVTS
Pete Letterman, Graff Area Vocational Center
Duane Lighthill, North Central AVTS
Tom McLaughlin, Chillicothe AVTS
J. C. Niday, Sr., Kansas City Tech. Education Center
George Rocca, Lewis & Clark Tech. School
Glen Seifert, Platte Co. AVTS
Robert Williams, State Fair Community College

These CRTs were technically reviewed and/or field-tested by the following educators.

Charles Oviatt, educational consultant, Vienna, Mo.
Pete Letterman, Graff Area Vocational Center
Duane Lighthill, North Central AVTS
Tom McLaughlin, Chillicothe Area Vo-Tech
J. C. Niday, Sr., Kansas City Tech. Educ. Center
George Rocca, Lewis & Clark Tech. School
Glen Seifert, Platte Co. AVTS
Robert Williams, State Fair Community College

Support and contributions of IML staff members were instrumental to this project's development.

Harley Schlichting, director
Amon Herd, associate director
Phyllis Miller and Dan Stapleton, assistant directors
Crystal Dietiker, graphic designer
Lori Holliday, word processor III
Fred Smith, graduate assistant
Mary Beth Ramsey and Dana Benedicktus, student assistants - clerical

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TABLE OF CONTENTS

Duty and task Page #

A. Basic Skills 1
  1. Identify and correct or report safety hazards
  2. Identify and utilize proper storage for flammables
  3. Identify and demonstrate correct use of fire extinguishers
  4. Identify ventilation hazards and take corrective action
  5. Observe and adhere to safety labels
  6. Maintain, use and safely work with machines, tools and equipment
  7. Obtain and use reference books and charts
  8. Apply math to solution of welding problems - whole numbers, fractions, decimals, geometry and trigonometry
  9. Identify basic hand tools
  10. Select, use and care for hand tools
  11. Use power machinery, grinder, drill press and power saw safely/correctly
  12. Properly store electrodes and filler materials
  13. Read and implement welding procedures
  14. Identify basic power sources
  15. Perform a weld test (destructive/nondestructive)

B. Print Reading 29
  1. Read and interpret basic prints
  2. Interpret welding symbols, abbreviations and joint designs
  3. Construct an exercise(s) using basic print and sketch
  4. Make sketches - pictorial and orthographic
  5. Interpret structural shapes, sizes and weights

C. Oxy-Fuel Cutting/Welding 39
  1. Demonstrate safety procedures
  2. Identify types of fuels and their application
  3. Handle, make preliminary safety inspection and store cylinders properly
  4. Identify, select and set up oxy-fuel welding and cutting equipment
  5. Light and adjust flame for welding and cutting
  6. Pierce holes and cut slots
  7. Make straight 90 degree and beveled cuts on mild steel plate and pipe
  8. Make circle cuts - off hand and with guide
  9. Lay out, cut and fit pipe, plate and structural shapes
  10. Run stringer bead without filler metal
  11. Run stringer bead and joints with filler metal in flat position
  12. Run stringer bead and joints with filler metal in horizontal position
  13. Run stringer bead and joints with filler metal in vertical position
  14. Run stringer bead and joints with filler metal in overhead position
  15. Braze weld carbon steel
  16. Braze weld cast iron
  17. Prepare weld for testing and pass visual test
  18. Identify welding and cutting problems, their causes and take corrective action
  19. Identify and select correct welding/brazing rod

D. Layout and Fit-Up 83
  1. Make layout of material for plate, structural and pipe fabrication
  2. Prepare material for weld procedure

E. Shielded Metal Arc - General 87
  1. Demonstrate safety procedures
  2. Describe theory of shielded metal arc welding
  3. Identify and select power source and set current for weld procedure
  4. Identify and make proper electrode selection for base material and material thickness
  5. Identify joint design and prepare material for weld procedure
  6. Identify welding problems, their causes and take corrective action
  7. Build pad of beads in flat position with E-6010 or E-6011

8. Build pad of beads in flat position with E-7024
9. Build pad of beads in flat position with E-7018
10. Build pad of beads in horizontal position with E-6010 or E-6011
11. Build pad of beads in horizontal position with E-7018
12. Build pad of beads in vertical position with E-6010 or E-6011
13. Build pad of beads in vertical position with E-7018
14. Build pad of beads in overhead position with E-6010 or E-6011
15. Build pad of beads in overhead position with E-7018
16. Prepare weld for test*

F. **Shielded Metal Arc - 3/8" plate** 103
1. Make weld in 1F position with E-6010 or E-6011*
2. Make weld in 1F position with E-7024*
3. Make weld in 1F position with E-7018*
4. Make weld in 2F position with E-6010 or E-6011*
5. Make weld in 2F position with E-7024*
6. Make weld in 2F position with E-7018*
7. Make weld in 3F position with E-6010 or E-6011*
8. Make weld in 3F position with E-7018*
9. Make weld in 4F position with E-6010 or E-6011*
10. Make weld in 4F position with E-7018*
11. Make weld in 1G position with E-6010 or E-6011*
12. Make weld in 1G position with E-7024 (3 passes maximum)*
13. Make weld in 1G position with E-7018*
14. Make weld in 2G position with E-6010 or E-6011*
15. Make weld in 2G position with E-7024 (3 passes maximum)*
16. Make weld in 2G position with E-7018*
17. Make weld in 3G position with E-6010 or E-6011*
18. Make weld in 3G position with E-7018*
19. Make weld in 4G position with E-6010 or E-6011*
20. Make weld in 4G position with E-7018*

G. **Shielded Metal Arc - Pipe (2"-6" dia.)** 113
1. Make weld in 1G position with E-6010 or E-6011*
2. Make weld in 1G position with E-7024 (3 passes maximum)*
3. Make weld in 1G position with E-7018*
4. Make weld in 2G position with E-6010 or E-6011*
5. Make weld in 2G position with E-7024 (3 passes maximum)*
6. Make weld in 2G position with E-7018*
7. Make weld in 5G position with E-6010 or E-6011*
8. Make weld in 5G position with E-7018*
9. Make weld in 6G position with E-6010 or E-6011*
10. Make weld in 6G position with E-7018*

H. **Shielded Metal Arc - 16 ga. steel** 121
1. Make weld in 1F position with E-6010 or E-6011
2. Make weld in 1F position with E-7018
3. Make weld in 2F position with E-6010 or E-6011
4. Make weld in 2F position with E-7018
5. Make weld in 3F position with E-6010 or E-6011
6. Make weld in 3F position with E-7018
7. Make weld in 4F position with E-6010 or E-6011
8. Make weld in 4F position with E-7018
9. Make square butt weld in 1G position with E-6010 or E-6011
10. Make square butt weld in flat position with E-7018
11. Make square butt weld in horizontal position with E-6010 or E-6011
12. Make square butt weld in horizontal position with E-7018
13. Make square butt weld in vertical position with E-6010 or E-6011
14. Make square butt weld in vertical position with E-7018
15. Make square butt weld in overhead position with E-6010 or E-6011
16. Make square butt weld in overhead position with E-7018

I. **Gas Metal Arc Welding - Plate, Pipe** (stainless steel, aluminum and carbon steel) 149
1. Demonstrate safety procedures
2. Identify, select and safely handle shielding gases for various transfer modes
3. Adjust current, voltage, wire feed rate and gas flow
4. Identify, select and set up equipment and explain functions
5. Identify and select solid wire electrode for carbon steel
6. Identify and select solid wire electrode for aluminum
7. Identify and select solid wire electrode for stainless steel
8. Identify types of cored wire electrodes for carbon steel and stainless steel
9. Select cored wire electrode for carbon steel
10. Build pad of beads in flat position with carbon steel–cored and solid wire (plate)
11. Build pad of beads in horizontal position with carbon steel–cored and solid wire (plate)
12. Build pad of beads in vertical position with carbon steel–cored and solid wire (plate)
13. Build pad of beads in overhead position with carbon steel–solid wire (plate)
14. Make weld in 1F position with carbon steel–cored and solid wire*
15. Make weld in 1F position with aluminum*
16. Make weld in 1F position with stainless steel*
17. Make weld in 2F position with carbon steel–cored and solid wire*
18. Make weld in 2F position with aluminum*
19. Make weld in 2F position with stainless steel*
20. Make weld in 3F position with carbon steel–cored and solid wire*
21. Make weld in 4F position with carbon steel–cored and solid wire*
22. Make square butt weld in flat position with carbon steel–cored and solid wire
23. Make square butt weld in flat position with aluminum
24. Make square butt weld in flat position with stainless steel
25. Make weld in 1G position with carbon steel–cored and solid wire*
26. Make weld in 2G position with carbon steel–cored and solid wire*
27. Make weld in 3G position with carbon steel–uphill*
28. Make weld in 3G position with carbon steel–downhill*
29. Make weld in 5G position with carbon steel–downhill (pipe)*
30. Make weld in 5G position with carbon steel–uphill (pipe)*
31. Make weld in 6G position with carbon steel (pipe)*
32. Identify welding problems, their causes and take corrective action
33. Prepare weld for test*

J. **Gas Tungsten-Arc Welding** (carbon steel, stainless steel, aluminum) 185
1. Demonstrate safety procedures
2. Identify, select and set up equipment and explain function
3. Identify, select and safely handle shielding gases
4. Identify, select, shape and install tungsten electrode
5. Adjust current, gas flow setting and post flow timer and strike arc
6. Identify joint design and prepare material for weld procedure
7. Select filler rod for base material
8. Build pad of beads in flat position
9. Build pad of beads in horizontal position
10. Build pad of beads in vertical position
11. Build pad of beads in overhead position
12. Make weld in 1F position, stainless steel*
13. Make weld in 1F position, aluminum*
14. Make weld in 1F position, carbon steel*
15. Make weld in 2F position, stainless steel*
16. Make weld in 2F position, aluminum*
17. Make weld in 2F position, carbon steel*
18. Make weld in 3F position, stainless steel*
19. Make weld in 3F position, aluminum*
20. Make weld in 3F position, carbon steel*
21. Make weld in 4F position, stainless steel*
22. Make weld in 4F position, aluminum*
23. Make weld in 4F position, carbon steel*
24. Make weld in 1G position, stainless steel*

25. Make weld in 1G position, aluminum*
26. Make weld in 1G position, carbon steel*
27. Make weld in 2G position, stainless steel*
28. Make weld in 2G position, aluminum*
29. Make weld in 2G position, carbon steel*
30. Make weld in 3G position, stainless steel*
31. Make weld in 3G position, aluminum*
32. Make weld in 3G position, carbon steel*
33. Identify welding problems, their causes and take corrective action
34. Prepare weld for test*

K. **Plasma Cutting** 253
1. Demonstrate safety procedures
2. Set up and operate plasma cutting equipment
3. Lay out and make straight line cuts on nonferrous metal
4. Lay out and make bevel cuts on nonferrous metal
5. Lay out and make circular cuts on nonferrous metal
6. Lay out and make pattern cuts on nonferrous metal
7. Lay out, cut and bevel pipe to a 30-37 1/2 degree angle on nonferrous metal
8. Lay out and cut square and round solid stock on nonferrous metal
9. Identify, select and safely handle cutting gases

L. **Metallurgy and Heat Treating** 261
1. Demonstrate safety procedures
2. Identify the classification and physical properties of ferrous and nonferrous metals
3. Identify and apply principles of preheating and postheating
4. Describe and apply principles of metallurgy in annealing, hardening and tempering
5. Describe methods of testing metals
6. Identify types of ferrous metal by spark test
7. Describe the relationship between the hardness test of weld, heat affect zone and base metal, and interpret the results

M. **Carbon-Arc Cutting** 273
1. Demonstrate safety procedures
2. Set up and operate carbon-arc cutting equipment
3. Remove weld material

*All welds in compliance with AWS-D1.1 or ASME Section IX Codes

Field	Contents	Field	Contents
1	**Unique item number**	5	**Date (MMYY)**
2	**Duty area and task number** (Mo. competency profile)	6	**Learning domain** (Cognitive, Affective, Psychomotor)
3	**Letter of correct answer**	7	**Writer(s)/reviewer(s)**
4	**Source** (author, year of publication)	8	**Accompanying artwork** (ART)

....
1. | A1 | a | Sacks | 0889 | C | Harry Batz |

What is the proper procedure to follow if a gas regulator is difficult to attach to a cylinder?

a. Report problem to supervisor or instructor.

b. Use a bigger wrench if the one being used is too small.

c. Use a non-detergent oil or thin grease on threads.

d. Release the pressure adjusting screw on the regulator.

....
2. | A1 | b | IML Mod. 1 | 0889 | C | Harry Batz |

It is OK to use an arc welding machine that is NOT grounded as long as the welder is working at least 10' from the machine.

a. True

b. False

....
3. | A1 | b | VICA | 0889 | C | Harry Batz |

Who is primarily responsible for protecting workers in the vicinity of an arc welding operation?

a. Foreman

b. Individual welder

c. Plant supervisor

d. Safety officer assigned to the area

....
4. | A1 | b | Sacks | 0889 | C | Harry Batz |

What is the proper filter lens shade number when SMAW welding with a 1/8" electrode?

a. #6

b. #10

c. #11

d. #12

....
5. | A1 | c | Sacks | 0889 | C | Harry Batz |

What is the proper repair procedure for a leaking gas hose?

a. Wrap plastic tape over the leak.

b. Move the hose so tha[illegible] leak is not near the welder.

c. Cut out the leak and insert a hose splice.

d. Replace all of the hose connections.

....
6. | A1 | c | VICA | 0889 | C | Harry Batz |

What should be used to pick up hot metal?

a. Gloves

b. Chipping hammer

c. Tongs

d. Steel brush

....

7. | A1 | e | VICA | 0889 | C | Harry Batz |

Who is reponsible for safety in the welding shop?

a. Manufacturer of the equipment

b. Employer

c. Individual who is welding

d. Government

e. All of the above

....

8. | A1 | d | IML Mod. 1 | 0889 | C | Harry Batz |

When can oxygen be used in place of compressed air?

a. Blow dust off of clothing

b. Blow dust and debris out of holes

c. Dry moisture from metal to be welded

d. Never

....

9. | A1 | d | VICA | 0889 | C | Harry Batz |

How can an electrical drop light (trouble light) be made safe?

a. Use correct color.

b. Use correct voltage.

c. Use only outdoors.

d. Use with approved guard.

....
10. | A1 | 1-c, 2-d, 3-b, 4-a | Jeffus & Johnson | 0889 |
C | Harry Batz |

Match safety terms with definitions.

1. _____ Burn that makes the skin red
2. _____ Burn that causes a blister
3. _____ Burn that chars the skin
4. _____ Person who stands by while a welder is working

a. Fire watch
b. 3rd degree
c. 1st degree
d. 2nd degree
e. Helper

Field	Contents	Field	Contents
1	**Unique item number**	5	**Date (MMYY)**
2	**Duty area and task number** (Mo. competency profile)	6	**Learning domain** (Cognitive, Affective, Psychomotor)
3	**Letter of correct answer**	7	Writer(s)/reviewer(s)
	Source (author, year of publication)	8	Accompanying artwork (ART)

....

11. | A2 | b | Sacks | 0889 | C | Harry Batz |

What is the best precaution to observe when welding near combustible materials?

a. Cover the combustible material.

b. Move the combustible material to a safe location.

c. Have someone stand by with a fire extinguisher.

d. Weld facing away from the combustible material.

....

12. | A2 | b | IML Mod. 1 | 0889 | C | Harry Batz |

Oils (motor, hydraulic or cutting) can be stored with oxygen cylinders as long as they are in a closed container.

a. True

b. False

....

13. | A2 | b | Sacks | 0889 | C | Harry Batz |

What is the preferred procedure for storing acetylene and oxygen cylinders?

a. In separate rooms

b. In sheltered outside, separate, secured areas

c. In the same room at least 20' apart

d. In the same room with a 5' masonry wall between them

....

14. | A2 | c | Sacks | 0889 | C | Harry Batz |

Where should oily rags and wiping materials be stored?

a. Welder's tool box

b. Tool room

c. Approved container

d. Storage room

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
4	Source (author, year of publication)	8	Accompanying artwork (ART)

....

15. | A3 | b | Jeffus & Johnson | 0889 | C | Harry Batz |

What marking identifies a fire extinguisher that is to be used on combustible liquids?

a. A

b. B

c. C

d. D

....

16. | A3 | c | Jeffus & Johnson | 0889 | C | Harry Batz |

What marking identifies a fire extinguisher that is to be used on electrical fires?

a. A

b. B

c. C

d. D

....

17. | A3 | c | Kennedy | 0889 | C | Harry Batz |

What fuel is present in a Class A fire?

a. Oil, grease or paint

b. Electrical equipment

c. Wood, paper or clothing

d. Flammable metals

....

18. | A3 | c | Jeffus & Johnson | 0889 | C | Harry Batz |

Where is the stream from the fire extinguisher directed?

a. Back and forth 5' above the burning material

b. Directly at the middle of the flame

c. At the base of the flame

d. Directly at the fire from 10' away

....

19. | A3 | c | IML Mod. 1 | 0889 | C | Harry Batz |

Which of the fire extinguishers below can be used on electrical fires?

a. Class A or C

b. Class A, B or C

c. Class C

d. All of the above

....

20. | A3 | d | Kennedy | 0889 | C | Harry Batz |

How can a fire be put out or prevented?

a. Cool the material.

b. Remove the fuel.

c. Smother the fire.

d. All of the above

Field	Contents	Field	Contents
1	**Unique item number**	5	**Date (MMYY)**
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21. | A3 | d | Jeffus & Johnson | 0889 | C | Harry Batz |

What marking identifies a fire extinguisher that is to be used on combustible metals?

a. A

b. B

c. C

d. D

....

22. | A4 | b | Jeffus & Johnson | 0889 | C | Harry Batz |

Why is ventilation important in the welding shop?

a. It keeps some of the dust off of clothing.

b. It helps to eliminate toxic fumes.

c. It cools the welded pieces.

d. It keeps the electrodes and welding gases cool.

....

23. | A4 | c | Jeffus & Johnson | 0889 | C | Harry Batz |

What equipment should the welder use if welding where toxic fumes are present?

a. Portable ventilator

b. Mechanical exhaust system

c. Air-supplied breathing mask

d. Portable filter system

....

24. | A4 | b | Jeffus & Johnson | 0889 | C | Harry Batz |

Argon, carbon dioxide and helium are inert, non-flammable gases that do NOT create a hazard requiring ventilation.

a. True

b. False

....

25. | A4 | a | Jeffus & Johnson | 0889 | C | Harry Batz |

The largest enclosed area that does NOT require forced ventilation for one welder is 10,000 cu. ft.

a. True

b. False

....

26. | A4 | d | AWS Handbook | 0889 | C | Harry Batz |

What is the primary reason one should NOT weld on closed containers?

a. Toxic fumes may be released.

b. The heat could warp the metal.

c. Rust and scale may break loose.

d. The container may explode.

....

27. | A4 | e | AWS Handbook | 0889 | C | Harry Batz |

What kind of ventilation methods are used in welding shops?

a. Natural

b. General mechanical

c. Overhead exhaust hoods

d. Portable

e. All of the above

....
28. | A5 | a | IML Mod. 1 | 0889 | C | Harry Batz |

Safety labels and color codes are used to warn the welder of possible hazards in the welding shop.

a. True

b. False

....
29. | A5 | d | IML Mod. 1 | 0889 | C | Harry Batz |

When should an instruction label be removed from a piece of equipment?

a. After it is properly installed

b. After everyone has read it

c. After the equipment has been used for more than one week

d. Never

....

30. | A6 | a | IML Mod. 1 | 0889 | C | Harry Batz |

When should the welder use power tools?

a. To save time

b. Late morning or afternoon to disturb fewer people

c. Only on construction jobs

d. Only in the welding shop

....

31. | A6 | b | IML Mod. 1 | 0889 | C | Harry Batz |

What should be done first before using any power tools?

a. Wear an apron.

b. Check equipment for unsafe conditions.

c. Turn on the switch to see if it works.

d. Wear a heavy face shield.

....

32. | A6 | b | IML Mod. 1 | 0889 | C | Harry Batz |

What should be checked first before using any power equipment?

a. Hangtags

b. Shields and guards

c. Lights

d. Floor mats

....
33. | A6 | c | IML Mod. 1 | 0889 | C | Harry Batz |

What kind of clothing should be worn when working around power equipment?

a. Bright colors that are easy to see

b. Stylish

c. Free from fraying and tears

d. Dull colored

....
34. | A6 | d | IML Mod. 1 | 0889 | C | Harry Batz |

What is the primary rule for maintaining a tool or piece of equipment?

a. Use it for any purpose.

b. Make sure the area is clear.

c. Keep it clean.

d. Use only for its intended purpose.

....
35. | A6 | d | IML Mod. 1 | 0889 | C | Harry Batz |

When should safety glasses be worn in the welding shop?

a. Only when welding

b. When operating machinery

c. When grinding or hammering

d. At all times

Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
2	Duty area and task number (Mo. competency profile)	6	Learning domain (Cognitive, Affective, Psychomotor)
3	Letter of correct answer	7	Writer(s)/reviewer(s)
4	Source (author, year of publication)	8	Accompanying artwork (ART)

....

36. | A7 | a | IML Mod. 1 | 0889 | C | Harry Batz |

How can a welder find information in a welding book?

a. Use table of contents.

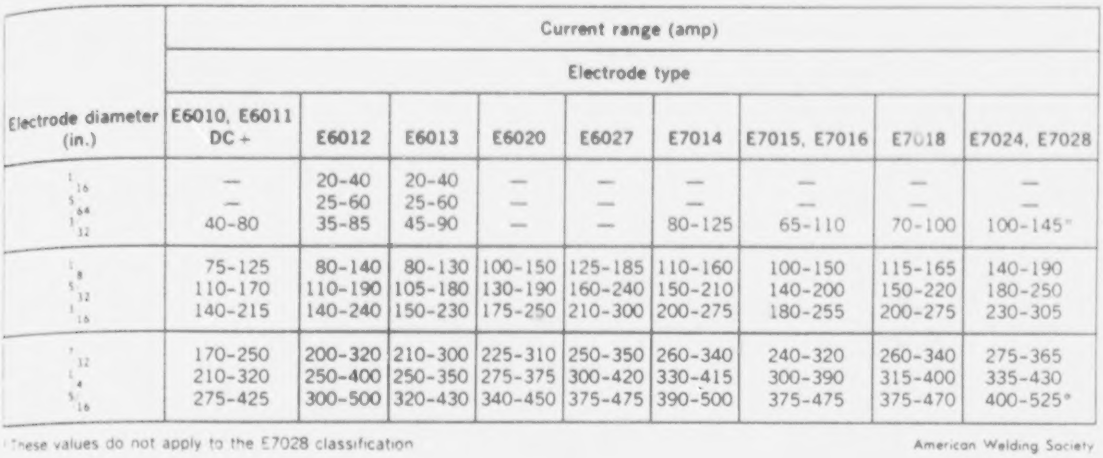
b. Look through the book page by page.

c. Ask the instructor.

d. Ask another welder.

....

37. | A7 | b | Sacks, pg. 201 | 0889 | C | Harry Batz | ART (2.75")



Electrode diameter (in.)	Current range (amp)								
	Electrode type								
	E6010, E6011 DC +	E6012	E6013	E6020	E6027	E7014	E7015, E7016	E7018	E7024, E7028
1/16	—	20-40	20-40	—	—	—	—	—	—
5/64	—	25-60	25-60	—	—	—	—	—	—
3/32	40-80	35-85	45-90	—	—	80-125	65-110	70-100	100-145[a]
1/8	75-125	80-140	80-130	100-150	125-185	110-160	100-150	115-165	140-190
5/32	110-170	110-190	105-180	130-190	160-240	150-210	140-200	150-220	180-250
3/16	140-215	140-240	150-230	175-250	210-300	200-275	180-255	200-275	230-305
7/32	170-250	200-320	210-300	225-310	250-350	260-340	240-320	260-340	275-365
1/4	210-320	250-400	250-350	275-375	300-420	330-415	300-390	315-400	335-430
5/16	275-425	300-500	320-430	340-450	375-475	390-500	375-475	375-470	400-525[a]

[a] These values do not apply to the E7028 classification

American Welding Society

On the chart above, what is the proper current range for the 1/8" E7018 electrode?

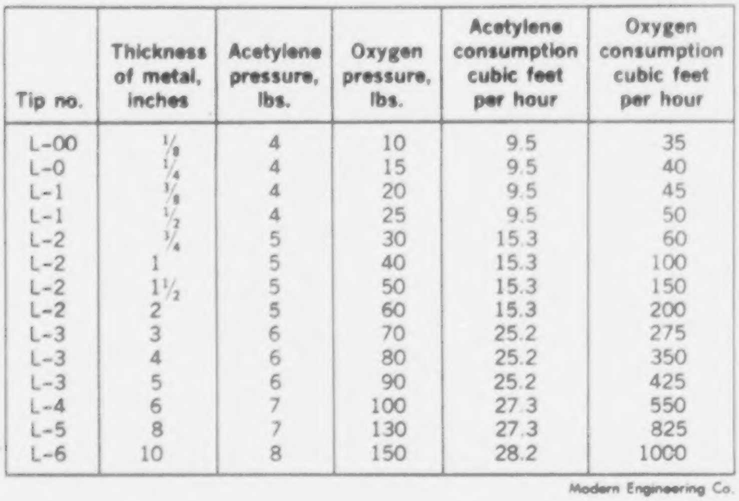
a. 70-100

b. 115-165

c. 200-275

d. 260-340

....
38. | A7 | c | Sacks, pg. 231 | 0889 | C | Harry Batz
| ART



Tip no.	Thickness of metal, inches	Acetylene pressure, lbs.	Oxygen pressure, lbs.	Acetylene consumption cubic feet per hour	Oxygen consumption cubic feet per hour
L-00	1/8	4	10	9.5	35
L-0	1/4	4	15	9.5	40
L-1	3/8	4	20	9.5	45
L-1	1/2	4	25	9.5	50
L-2	3/4	5	30	15.3	60
L-2	1	5	40	15.3	100
L-2	1 1/2	5	50	15.3	150
L-2	2	5	60	15.3	200
L-3	3	6	70	25.2	275
L-3	4	6	80	25.2	350
L-3	5	6	90	25.2	425
L-4	6	7	100	27.3	550
L-5	8	7	130	27.3	825
L-6	10	8	150	28.2	1000

Modern Engineering Co.

On the chart above, what is the proper acetylene pressure for the #3 cutting tip when working on 3" thick metal?

a. 3

b. 5

c. 6

d. 8

....
39. | A7 | d | Sacks, pg. 231 | 0889 | C | Harry Batz
| ART

On the chart above, what is the proper oxygen pressure for the #2 tip when working on 2" thick metal?

a. 20

b. 30

c. 50

d. 60

....
40. | A7 | c | IML Mod.1 | 0889 | C | Harry Batz |

If the information needed is NOT found in the table of contents, what is the next best way to find it?

a. Looking page by page

b. Using the glossary

c. Using the index

d. All of the above

....
41. | A7 | b | Sacks, pg. 774 | 0889 | C | Harry Batz | ART

Work thickness	Welding current—amperes			Dia. tungsten	Filler rod size	Cup size	Gas flow cu. ft./hr.
	Flat	Vertical	Overhead				
1/16"	60-90	60-90	60-90	1/16"	1/16"	1/4, 5/16, 3/8	15
1/8"	125-160	115-135	120-160	3/32"	3/32"	3/8, 7/16	17
3/16"	190-240	190-220	180-210	1/8"	1/8"	7/16, 1/2	21
1/4"	260-340	220-260	210-250	3/16"	1/8", 3/16"	1/2, 5/8, 3/4	25
3/8"	330-400	250-300	250-300	3/16", 1/4"	3/16", 1/4"		29
1/2"	400-470	290-350	250-375	3/16", 1/4"	3/16", 1/4"		31

Eutectic Alloy Corp.

On the chart above, what is the proper current range for a 3/32" tungsten electrode when welding 1/8" aluminum and argon shielding gas in the vertical position?

a. 60-90

b. 115-135

c. 120-160

d. 125-160

....
42. | A9 | d | IML Mod. 1 | 0889 | C | Harry Batz |

What should a combination square be used for?

a. Measuring length

b. Laying out 90 degree angles

c. Laying out 45 degree angles

d. All of the above

....
43. | A9 | d | IML Mod. 1 | 0889 | C | Harry Batz |

Which are the two most common types of screwdrivers?

a. Standard and clutch

b. Cross-point and Torx

c. Figure 8 and clutch

d. Standard and cross-point

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....
44. | A9 | 1-d, 2-b, 3-c, 4-e, 5-a | IML Mod. 1 | 0889 |
C | Harry Batz | ART

Match the shapes of files below with their names.

1. _____ Round

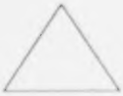
2. _____ Square

3. _____ Flat

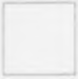
4. _____ Half-round

5. _____ Triangular

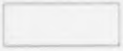
a.



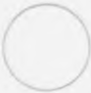
b.



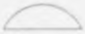
c.



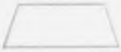
d.



e.



ab.



....

45. | A10 | a | IML Mod. 1 | 0889 | C | Harry Batz
|

What is the proper tool to use for cleaning the teeth of a file?

a. Carding brush

b. Sharp, pointed punch

c. Metal scribe

d. Pocket knife

Field	Contents	Field	Contents
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....
46. | A12 | a | Sacks | 0889 | C | Harry Batz |

How are electrodes protected from moisture and damage during shipment?

a. Packed in sturdy containers

b. Label instructions to keep dry

c. Label instructions read "fragile contents"

d. All of the above

....
47. | A12 | a | Sacks | 0889 | C | Harry Batz |

What is the best source of information about electrode protection?

a. Manufacturer's recommendations

b. Textbook

c. Welding supply salesman

d. Other welders

....
48. | A12 | b | Sacks | 0889 | C | Harry Batz |

How are electrodes best protected during prolonged storage after unpacking?

a. In manufacturer's package

b. In electric shop oven

c. In an out-of-the-way area

d. Back to the supplier

Field	Contents	Field	Contents
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....
49. | A12 | c | IML Mod. 1 | 0889 | C | Harry Batz |

What is the primary cause of electrode damage?

a. Light

b. Heat

c. Moisture

d. Dust

e. None of the above

....
50. | A12 | d | Sacks | 0889 | C | Harry Batz |

Where are electrodes stored to protect them from moisture in the field?

a. At least 3' above ground

b. Under cover during rain

c. In welder's pouch

d. In moisture-proof container

....
51. | A13 | a | Sacks | 0889 | C | Harry Batz |

What is a welding tack?

a. Short weld bead used to hold two pieces of metal together

b. Fastener to hold paper on the bulletin board

c. Instrument to count revolutions of a rotating part on a machine

d. A weld that is used to fill in a root opening

....
52. | A13 | a | Sacks | 0889 | C | Harry Batz |

Welding can cause the welded parts to be distorted out of shape.

a. True

b. False

....
53. | A13 | c | Giachano & Weeks | 0889 | C | Harry Batz |

What is preheating?

a. Heating the workplace during cold weather

b. Heating the weldment after welding to control distortion

c. Heating the weldment before welding to control distortion

d. Heating the metal to clean it before welding

Field	Contents	Field	Contents
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....

54. | A13 | d | Sacks | 0889 | C | Harry Batz |

What is a root opening?

a. Angle of the workpiece to the welding table

b. Connection of the electrode cable to the machine

c. Space left in the metal when cut with a cutting torch

d. Space between two pieces of metal to be welded

....

55. | A14 | a | Sacks | 0889 | C | Harry Batz |

How is the size of a welding machine indicated?

a. Amount of current produced

b. Height x width x length

c. Weight of the machine

d. Length of electrode cables

....

56. | A14 | b | Sacks | 0889 | C | Harry Batz |

What type of welding power source is the most economical to buy and use?

a. Motor generator

b. Transformer rectifier

c. Engine-driven generator

d. Inverter machine

....

57. | A14 | b | Sacks | 0889 | C | Harry Batz |

What is the duty cycle of a welding machine?

a. Number of short welds that can be made in one minute

b. Percentage of any 10 min. period that the machine can be operated at its rated size

c. Number of times the machine can be started and stopped

d. Number of different-sized electrodes that can be used

Field	Contents	Field	Contents
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....

58. | A14 | d | Sacks | 0889 | C | Harry Batz |

What should be the duty cycle of a machine used for heavy continuous welding?

a. 20%

b. 40%

c. 60%

d. 100%

....
59. | A15 | a | Sacks | 0889 | C | Harry Batz |

What is NOT a testing procedure?

a. Undercutting

b. Visual

c. Destructive

d. Magnetic

....
60. | A15 | b | Sacks | 0889 | C | Harry Batz |

What testing procedure is most economical to detect surface porosity?

a. Destructive

b. Visual

c. Dye penetrant

d. Ultrasonic

....
61. | A15 | c | Sacks | 0889 | C | Harry Batz |

What is the basic purpose of weld inspection?

a. See if weld looks good

b. Know that the welder is making enough welds

c. Ensure that the weld meets welding standards

d. See that the machine is working properly

Field	Contents	Field	Contents
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....

62. | A15 | d | Sacks | 0889 | C | Harry Batz |

What is a welding code?

a. Universal testing procedure

b. Testing procedure known to the welder

c. Information about a welding machine

d. Set of laws for a specific welding procedure

Field	Contents	Field	Contents
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....

1. | B1 | a | Bennett and Sey | 0889 | C | Pete Letterman |

What part of a print may form symbols, shows the true shape and aids in dimensioning?

a. Lines

b. Section views

c. Notes

d. Partial views

....

2. | B1 | b | Bennett and Sey | 0889 | C | Pete Letterman |

What part of a print indicates size and location?

a. Lines

b. Dimensions

c. Notes

d. Specifications

....

3. | B1 | b | Bennett and Sey | 0889 | C | Pete Letterman |

Which view of a print best indicates the true shape of the object?

a. Right side

b. Front

c. Top

d. Bottom

....

4. | B1 | c | Bennett and Sey | 0889 | C | Pete Letterman |

What part of a print gives construction details and may be expressed as a symbol or an abbreviation?

a. Lines

b. Dimensions

c. Notes

d. Section views

....

5. | B2 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

What part of the welding symbol designates position?

a. Reference

b. Tail

c. Arrow side

d. Other side

....

6. | B2 | a | IML Mod. 2 | 0889 | C | Pete Letterman |

Which abbreviation below indicates a type of metal?

a. H.R.S.

b. H.A.Z.

c. F.S.D.

d. F.A.O.

....

7. | B2 | a | Giachino & Weeks | 0889 | C | Pete Letterman |

Which of the joints listed below would be joined with a fillet weld?

a. Lap

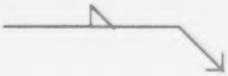
b. Butt

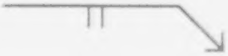
c. Edge

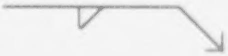
d. Outside corner

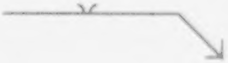
....
8. | B2 | c | IML Mod. 2 | 0889 | C | Pete Letterman
| ART

Which symbol represents an arrow side fillet weld?

a. 

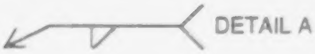
b. 

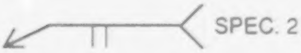
c. 

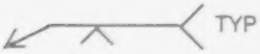
d. 

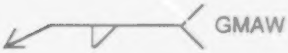
....
9. | B2 | d | Bennett and Sey | 0889 | C | Pete Letterman | ART

Which symbol indicates the welding process used?

a. 

b. 

c. 

d. 

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....

10. | B3 | a | Bennett and Sey | 0889 | C | Pete Letterman |

What type of view cuts halfway through with the cut part removed to show interior details?

a. Half section

b. Auxiliary

c. Full section

d. Developed

....

11. | B3 | b | Bennett and Sey | 0889 | C | Pete Letterman |

What type of view shows a part as it would appear before shaping or bending?

a. Auxiliary

b. Developed

c. Full section

d. Half section

....

12. | B3 | c | Bennett and Sey | 0889 | C | Pete Letterman |

What type of view cuts entirely through the object to show interior details?

a. Half section

b. Auxiliary

c. Full section

d. Developed

....
13. | B3 | d | Bennett and Sey | 0889 | C | Pete Letterman |

When a left-sided view and a right-sided view are both on a print, how are they shown?

a. Section views

b. Auxiliary views

c. Developed views

d. Partial views

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....

14. | B4 | b | Bennett and Sey | 0889 | C | Pete Letterman |

What type of drawing shows the true form of the object using two or more views?

a. Isometric drawing

b. Orthographic projection

c. Pictorial representation

d. Oblique drawing

....

15. | B4 | c | Bennett and Sey | 0889 | C | Pete Letterman |

What type of pictorial representation is shown drawn at a 45-degree angle?

a. Three-view drawing

b. Isometric sketch

c. Oblique sketch

d. Orthographic projection

....

16. | B4 | d | Bennett and Sey | 0889 | C | Pete Letterman |

What type of pictorial representation is shown drawn at a 30-degree angle?

a. Orthographic projection

b. Oblique sketch

c. Pictorial representation

d. Isometric sketch

....

17. | B4 | d | Bennett and Sey | 0889 | C | Pete Letterman |

Which part of the object will a pictorial representation show?

a. Front view

b. Top view

c. Side view

d. All of the above

....

18. | B5 | a | Bennett and Sey | 0889 | C | Pete Letterman |

What gage would be used when specifying the thickness of a sheet of carbon steel?

a. Manufacturer's standard gage for sheet steel

b. American Wire gage

c. Birmingham Wire gage

d. British Imperial Standard Wire gage

....

19. | B5 | b | Bennett and Sey | 0889 | C | Pete Letterman |

How is the size of a round bar specified?

a. Thickness

b. Diameter

c. Weight

d. Length

....

20. | B5 | c | Bennett and Sey | 0889 | C | Pete Letterman |

Which specifications are used to measure the thickness of sheet metal?

a. Gage number and metal gage

b. Gage number and decimal equivalent

c. Gage number, metal gage and decimal equivalent

d. Fractional part of an inch

....
21. | B5 | d | Bennett and Sey | 0889 | C | Pete Letterman |

What structure often has a weight specification to help indicate its size?

a. Flat bar

b. Angle iron

c. Tubing

d. Wide-flange beam

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4	**Source (author, year of publication)**	8	**Accompanying artwork (ART)**

....

1. | D1 | e | Msmt. & Layout | 0889 | C | Robert Williams |

Which process is a layout method?

a. Simple layout

b. Parallel line development

c. Triangulation

d. Radial line development

e. All of the above

....

2. | D1 | a | Msmt. & Layout | 0889 | C | Robert Williams |

When laying out cylindrically shaped products, allowances for edges, seams and bends must be added.

a. True

b. False

....

3. | D1 | d | Msmt. & Layout | 0889 | C | Robert Williams |

When developing patterns by the parallel line method, which step is first?

a. Bisecting an angle

b. Dividing a circle into equal arcs

c. Dividing a line by measurement

d. Dividing a line

....
4. | D1 | a | Zinngrabe | 0889 | C | Robert Williams |

The procedure for accurately placing measurements from a drawing or pattern to the metal is called measurement transfer.

a. True

b. False

5.

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....

5. | D2 | d | Msmt. & Layout | 0889 | C | Robert Williams |

Which method is NOT acceptable for cleaning metal for lay out?

a. Sand blasting

b. Wire brushing

c. Flame cleaning

d. Cleaning with gasoline

....

6. | D2 | b | Msmt. & Layout | 0889 | C | Robert Williams |

Which tool is NOT used for laying out metal?

a. Scriber

b. Hacksaw

c. Straight edge

d. Steel rule

....

7. | D2 | b | SFCC Formulas | 0889 | C | Robert Williams |

Which method is used as a rule of thumb for calculating bend allowances?

a. Add twice the metal's thickness for each bend.

b. Add one-half the metal's thickness for each bend.

c. Add one and a half the metal's thickness for each bend.

d. Add one quarter the metal's thickness for each bend.

....
8. | D2 | a | SFCC Formulas | 0889 | C | RW/Charles
Oviatt |

Metal cut by a thermal process must be allowed to cool before **measuring** for tolerance.

a. True

b. False

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....

1. | E1 | a | Giachino & Weeks | 0889 | C | George Rocca |

The welding cable should never wrap around any part of the body while welding.

a. True

b. False

....

2. | E1 | a | Giachino & Weeks | 0889 | C | George Rocca |

Why should an aluminum welding cable be larger than a copper welding cable?

a. Aluminum will overheat if the same size.

b. Aluminum carries the same amperage as copper.

c. Oxidation causes amperage to vary.

d. Copper costs more.

....

3. | E1 | d | Jeffus & Johnson | 0889 | C | George Rocca |

What metal does NOT give off toxic gases?

a. Lead

b. Zinc

c. Beryllium copper

d. Bronze

. . . .
4. | E1 | d | VICA | 0889 | C | George Rocca |

What is used to cool metal after the first pass is made on a practice plate?

a. Oil

b. Kerosene

c. Soap

d. Water

....
5. | E2 | b | IML Mod. 4 | 0889 | C | George Rocca |

What does the term duty cycle mean?

a. Purposes for which machine can be used

b. Percentage of time machine can be used continuously

c. Has no specific meaning for welder

d. Types of weld machine can perform during duty cycle

....
6. | E2 | b | Jeffus & Johnson | 0889 | C | George Rocca
|

What is used to eliminate arc blow?

a. DCSP

b. AC

c. DCRP

d. Short electrode

....
7. | E2 | a | Jeffus & Johnson | 0889 | C | George Rocca
|

What is open circuit voltage?

a. Voltage at the electrode before striking the arc

b. Voltage at the electrode after striking the arc

c. Voltage at the ground clamp while welding

d. All of the above

....
8. | E3 | b | VICA | 0889 | C | George Rocca |

Electrons in alternating currents move in which direction?

a. Away from the generator

b. First in one direction and then in the opposite direction

c. Randomly

d. From positive to negative

....
9. | E3 | b | VICA | 0889 | C | George Rocca |

To what piece of SMAW equipment should an electrode cable be attached when greater heat is required for penetration?

a. Ground cable

b. Positive pole

c. Negative pole

d. Larger electrode holder

....
10. | E3 | b | Jeffus & Johnson | 0889 | C | George Rocca |
ART

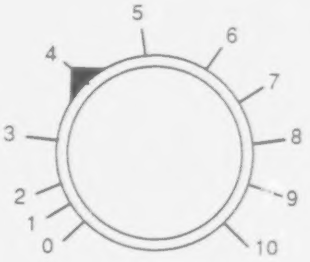
What is the estimated amperage at which the following knob is set? (10-120 amp range)

a. 46 A

b. 54 A

c. 60 A

d. 72 A



....

11. | E3 | d | Jeffus & Johnson | 0889 | C | George Rocca |

What form of welding current does an alternator produce?

a. AC and DC

b. DC with adjustable AC

c. DC only

d. AC only

....

12. | E3 | d | VICA | 0889 | C | George Rocca |

What should a welder strike the arc on to eliminate contamination in the weld?

a. Scrap steel

b. Flint

c. Backing strip

d. Starting block

....

13. | E4 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

What is the difference between 6010 and 6011 electrodes?

a. Core rod

b. Coatings

c. Amperage

d. Length

....

14. | F4 | b | AWS Handbook | 0889 | C | George Rocca |

What is the tensile strength of an E6010 electrode?

a. 50,000 psi

b. 60,000 psi

c. 70,000 psi

d. 80,000 psi

....

15. | E4 | b | IML Mod. 4 | 0889 | C | Harry Batz |

Which organization sets welding electrode specifications?

a. Navy

b. AWS

c. SAE

d. ASTM

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....

16. | E4 | c | IML Mod. 4 | 0889 | C | Harry Batz |

What does the last digit of the welding electrode classification code identify?

a. Position to be used

b. Tensile strength of the electrode

c. Type of coating on the electrode

d. Diameter of the electrode

....

17. | E4 | c | AWS Handbook | 0889 | C | George Rocca |

What is the tensile strength of an E7024 electrode?

a. 50,000 psi

b. 60,000 psi

c. 70,000 psi

d. 80,000 psi

....

18. | E4 | c | AWS Handbook | 0889 | C | George Rocca |

What is the tensile strength of an E7018 electrode?

a. 50,000 psi

b. 60,000 psi

c. 70,000 psi

d. 80,000 psi

....
19. | E5 | a | VICA | 0889 | C | George Rocca |

Which minimum thickness of plate requires edge preparation before welding?

a. 1/4"

b. 1/2"

c. 5/8"

d. 3/4"

....
20. | E5 | c | VICA | 0889 | C | George Rocca |

In SMAW, what is the purpose of edge preparation?

a. Makes joint alignment easier

b. Minimizes distortion

c. Allows deeper penetration

d. Removes impurities

....
21. | E5 | d | VICA | 0889 | C | George Rocca |

What is the space between two plates to be welded called?

a. Direction of travel

b. Stringer bead

c. Poor fit

d. Root opening

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....

22. | E5 | d | Jeffus & Johnson | 0889 | C | George Rocca |

What is the most frequently required included angle for a V groove?

a. 35 degrees

b. 37 1/2 degrees

c. 45 degrees

d. 60 degrees

....

23. | E6 | a | VICA | 0889 | C | George Rocca |

What is another term for gas pockets or voids in metal?

a. Porosity

b. Spatter

c. Undercut

d. Deposition rate

....

24. | E6 | a | Jeffus & Johnson | 0889 | C | George Rocca |

What effect does restarting an arc have on an open root weld?

a. Penetration and buildup are changed.

b. Arc blow and splatter is reduced.

c. The joint fills faster.

d. The joint fills slower.

....

25. | E6 | b | Jeffus & Johnson | 0889 | C | George Rocca |

How wide should a single cover pass be?

a. Not more than one-half the width of the groove opening

b. Not more than 1/4" wider than the groove opening

c. At least 1/2" wider than the groove opening

d. As wide as possible in order to add strength

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....

26. | E6 | a | VICA | 0889 | C | |

The bottom edges of a V-groove can have a square root face or can be feathered to a point.

a. True

b. False

....

27. | E6 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

What is often caused by excessive gaps in welding?

a. Smooth appearance

b. Uneven penetration

c. Burn-through

d. Lack of penetration

....

28. | E6 | d | VICA | 0889 | C | George Rocca |

What is the result of welding during windy or drafty conditions?

a. Shallow penetration

b. Excessive penetration

c. Arc blow

d. Poorly-shielded arc

....
29. | E7 | d | VICA | 0889 | C | Harry Batz |

What is the preferred width of a stringer?

a. One-half the electrode's diameter

b. The diameter of the electrode

c. Three times the electrode's diameter

d. Twice the electrode's diameter

....
30. | E7 | a | IML Mod. 4 | 0889 | C | George Rocca |

What is the correct angle for the electrode while welding the first bead in the flat position?

a. 5-10 degrees from vertical

b. 10-20 degrees from vertical

c. 15-25 degrees from vertical

d. 25-40 degrees from vertical

....
31. | E7 | a | Jeffus & Johnson | 0889 | C | George Rocca |

What polarity should be used when welding with E6010 and E6011 electrodes?

a. DC reverse and AC

b. DC straight

c. DC straight and AC

d. AC

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....

32. | E8 | d | Jeffus & Johnson | 0889 | C | George Rocca |

What polarity is used when welding with an E7024 electrode?

a. AC

b. AC or DCSP

c. DCSP

d. AC or DC, reverse polarity

....

33. | E11 | a | IML Mod. 4 | 0889 | C | George Rocca |

At what angle should an E7018 electrode be held for welding in the horizontal position?

a. 10-15 degrees from perpendicular

b. 25-35 degrees from perpendicular

c. 45-60 degrees from perpendicular

d. 90 degrees from perpendicular

....
34. | E12 | b | IML Mod. 4 | 0889 | C | George Rocca |

At what angle should the electrode be positioned for vertical up welding?

a. 5-10 degrees from perpendicular

b. 10-15 degrees from perpendicular

c. 25-30 degrees from perpendicular

d. 30-35 degrees from perpendicular

....
35. | E14 | a | IML Mod. 4 | 0889 | C | George Rocca
|

At what angle should the electrodes be positioned for overhead welding?

a. 10-15 degrees from perpendicular

b. 20-25 degrees from perpendicular

c. 25-30 degrees from perpendicular

d. 90 degrees from perpendicular

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....

1. | F1 | b | Sacks | 0889 | C | Duane Lighthill |

What is the proper rod angle for making a weld in the 1F position with a 6011 or 6010 rod?

a. 0-25 degrees in opposite direction of travel

b. 10-20 degrees in direction of travel

c. 20-30 degrees in direction of travel

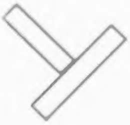
d. 30-40 degrees in opposite direction of travel

....

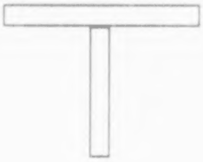
2. | F1,F2,F3 | a | IML Mod. 4 | 0889 | C | Duane Lighthill | ART

Which joint is in the 1F position?

a.



c.



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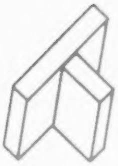

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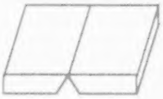


....
3. | F1-F10 | d | IML Mod. 4 | 0889 | C | Duane
Lighthill |

What does the F stand for in the 1F, 2F, 3F and 4F positions?

a. Fast

b. Flat

c. Form

d. Fillet

....
4. | F1,F2,F3,F11,F12,F13 | a | IML Mod. 4 | 0889 | C
| Duane Lighthill |

What does the 1 stand for in the 1F and 1G positions?

a. Flat

b. Horizontal

c. Vertical

d. Overhead

....
5. | F4,F5,F6 | b | IML Mod. 4 | 0889 | C | Duane
Lighthill |

What does the 2 stand for in the 2F and 2G positions?

a. Flat

b. Horizontal

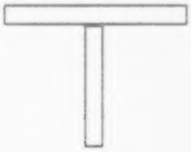
c. Vertical

d. Overhead

....
6. | F4,F5,F6 | b | IML Mod. 4 | 0889 | C | Duane
Lighthill | ART

Which joint is in the 2F position?

a.



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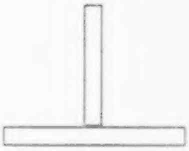
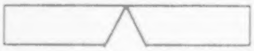


c.



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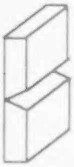
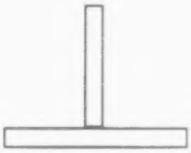


....

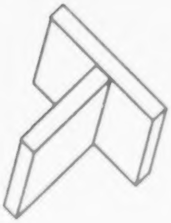
7. | F7,F8 | c | IML Mod. 4 | 0889 | C | Duane Lighthill | ART

Which joint is in the 3F position?

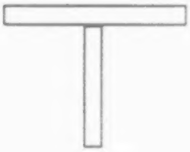
a.



c.



b.



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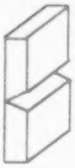


....

8. | F7, F8, F17, F18 | c | IML Mod. 4 | 0889 | C
| Duane Lighthill |

What does the 3 stand for in the 3F and 3G positions?

a. Flat

b. Horizontal

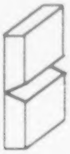
c. Vertical

d. Overhead

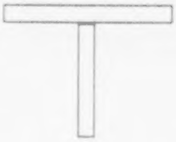
....
9. | F9,F10 | c | IML Mod. 4 | 0889 | C | Duane
Lighthill | ART

Which joint is in the 4F position?

a.



c.



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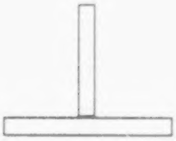

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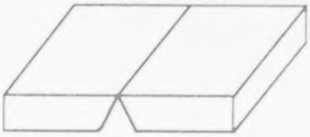


....
10. | F9,F10,F19,F20 | d | IML Mod. 4 | 0889 | C
| Duane Lighthill |

What does the 4 stand for in the 4F and 4G positions?

a. Flat

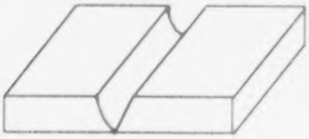
b. Horizontal

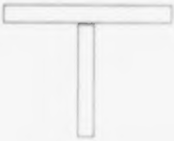
c. Vertical

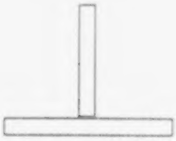
d. Overhead

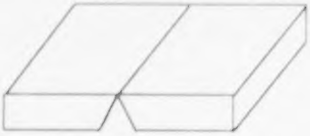
....
11. | F11,F12,F13 | a | IML Mod. 4 | 0889 | C | Duane Lighthill | ART

Which joint is in the 1G position?

a. 

c. 

b. 

d. 

....
12. | F11 thru F20 | a | IML Mod. 4 | 0889 | C | Duane Lighthill |

What does the G stand for in the 1G, 2G, 3G and 4G positions?

a. Groove

b. Gas

c. Good

d. None of the above

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7	**Writer(s)/reviewer(s)**
8	Accompanying artwork (ART)

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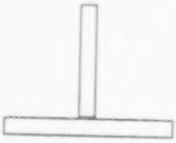
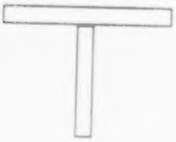
13. | F14,F15,F16 | d | IML Mod. 4 | 0889 | C | Duane Lighthill | ART

Which joint is in the 2G position?

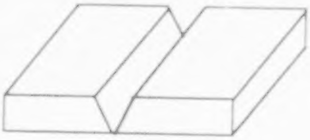
a.



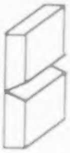
b.



c.



d.



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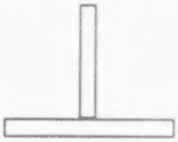
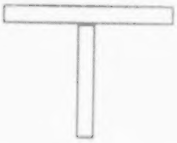
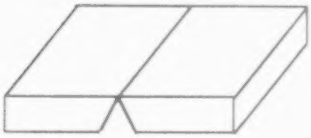
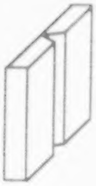
14. | F17,F18 | d | IML Mod. 4 | 0889 | C | Duane Lighthill | ART

Which joint is in the 3G position?

a. 

c. 

b. 

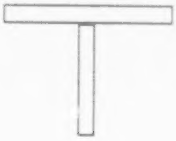
d. 

....

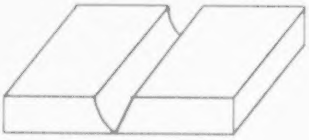
15. | F19,F20 | b | IML Mod. 4 | 0889 | C ¦ Duane Lighthll | ART

Which joint is in the 4G position?

a.



c.



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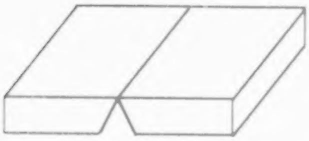
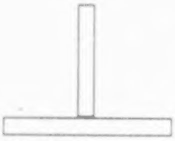


d.



....

1. | G1 | a | IML Mod. 4 | 0889 | C | Harry Batz |

When should pipe be welded using the downhill technique?

a. On thin walled pipe

b. On uneven ground

c. When using the E6011 electrode

d. When current is too low

....

2. | G1 | a | IML Mod. 4 | 0889 | C | Harry Batz |

The number of filler passes required in pipe welding depends on the wall thickness.

a. True

b. False

....

3. | G1 | b | Jeffus & Johnson | 0889 | C | Harry Batz |

How can low-pressure piping systems be tested or inspected?

a. Tensile test

b. Visual test

c. Ultrasonic test

d. Radiographic test

....

4. | G1 | b | Jeffus & Johnson | 0889 | C | Harry Batz |

What are high-pressure welded pipe systems used for?

a. Waste disposal

b. Radioactive materials

c. Trailer axles

d. Hand rails

....

5. | G1 | c | IML Mod. 4 | 0889 | C | Harry Batz |

Why should each layer or pass deposited in a pipe weld start and stop in a different place?

a. Keep the work from becoming monotonous

b. Make the weld look better

c. Ensure a strong weld bond

d. Keep the heat of the weld even

....

6. | G1 | c | Jeffus & Johnson | 0889 | C | Harry Batz |

When welding pipe, how wide can the E7018 electrode be weaved?

a. Two times the flux diameter

b. 1.5 times the groove width

c. Three times the electrode diameter

d. Four times the groove width

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	Source (author, year of publication)	8	**Accompanying artwork** (ART)

....

7. | G1 | d | Jeffus & Johnson | 0889 | C | Harry Batz |

What is the advantage in using welded pipe joints instead of threaded pipe joints?

a. Stronger

b. Less resistant to material flow

c. Lighter in weight

d. All of the above

....

8. | G1 | d | IML Mod. 4 | 0889 | C | Harry Batz |

Why is a backing ring used on pipe?

a. To keep pipe in alignment

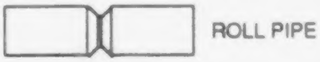
b. To work with tack welds

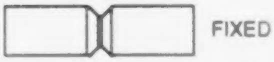
c. To prevent excessive penetration

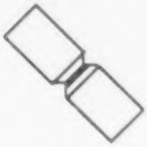
d. All of the above

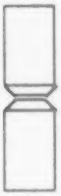
....
9. | G1,G2,G3 | a | IML Mod. 4 | 0889 | C | Harry Batz | ART

Which of the pipe joints below is a 1G?

a. 

b. 

c. 

d. 

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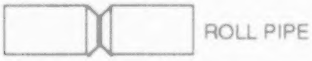
....
10. | G4,G5,G6 | d | IML Mod. 4 | 0889 | C | Harry Batz | ART

Which of the pipe joints below is a 2G?

a.



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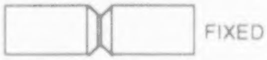
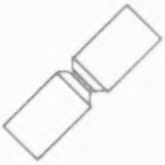
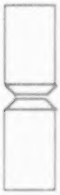


c.



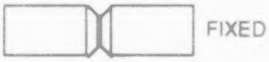
d.

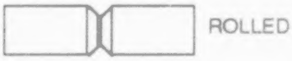


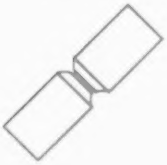
....

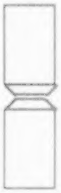
11. | G7,G8 | a | IML Mod. 4 | 0889 | C | Harry Batz | ART

Which of the pipe joints below is a 5G?

a. 

b. 

c. 

d. 

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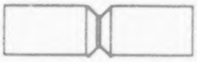
. . . .

12. | G9,G10 | c | IML Mod. 4 | 0889 | C | Harry Batz | ART

Which of the pipe joints below is a 6G?

a.



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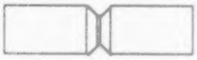
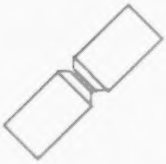


c.



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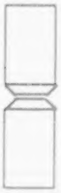

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....

1. | H1 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

What size of electrode is most suitable for welding 16-ga. steel?

a. 1/16"

b. 3/32"

c. 1/8"

d. 5/32"

....

2. | H1 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

Why is an electrode used at a lower amperage?

a. Reduce build-up

b. Improve penetration

c. Eliminate burn-through

d. Eliminate slag inclusions

....

3. | H1 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

What is the approximate thickness of 16-ga. sheet metal?

a. 1/8"

b. 3/32"

c. 1/16"

d. 3/16"

4. | H1 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

What happens when the arc length becomes larger?

a. Amperage is lower

b. Amperage is higher

c. Voltage stays the same

d. Voltage is higher

57

Field	Contents	Field	Contents
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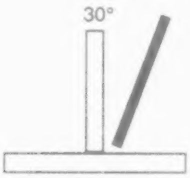
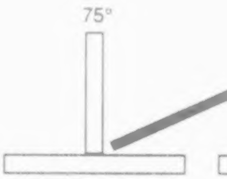
....

5. | H2 | a | IML Mod. 4 | 0889 | C | J.C. Niday | ART

What is the proper electrode angle when making a fillet weld on 16-gauge with 7018 in the horizontal position?



a.



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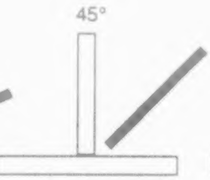

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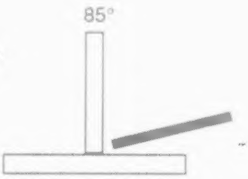

d.

....

6. | H2 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

Which position is most economical when using 7018 electrodes?

a. Flat

b. Horizontal

c. Vertical

d. Overhead

....

7. | H2 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

DCSP current should be used with 7018 in the flat position on 16 gauge.

a. True

b. False

....

8. | H2 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

A very light whipping motion is NOT allowed when using 7018 electrodes on 16-ga. mild steel.

a. True

b. False

....

9. | H2 | d | IML Mod. 4 | 0889 | C | J.C. Niday |

What welding process should be used to fillet weld 16-ga. metal in the flat position with a 7018 electrode?

a. GMAW

b. GTAW

c. SAW

d. SMAW

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....

10. | H3 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

The usual safety precautions and equipment do NOT apply in sheet metal welding.

a. True

b. False

....

11. | H3 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

Which describes weld symbols on sheet metal joints?

a. Same as plate

b. Opposite of plate

c. Not used

....

12. | H3 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

Which is a good method to adjust amperage for shielded metal arc welding?

a. Depend on machine indicators

b. Ask instructor

c. Try and retry on similar scrap

d. Ask classmate

....
13. | H3 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

How is sheet metal weld inspection usually accomplished?

a. Bend testing

b. X-ray testing

c. Visual testing

d. Magnetic particle testing

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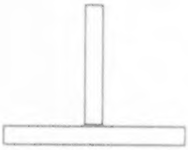
....

14. | H4 | a | IML Mod. 4 | 0889 | C | J.C. Niday | ART

Which of the drawings below describe the 2F position?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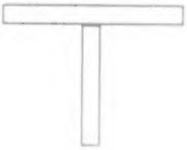
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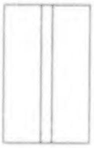
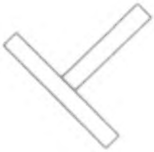

c.


d.

....

15. | H4 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

X-ray testing is most commonly used to inspect sheet metal weldments.

a. True

b. False

....

16. | H4 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

How do safety rules and equipment required to weld 16-ga. sheet metal compare with those for plate metal?

a. More strict

b. Less strict

c. The same

d. None of the above

....

17. | H4 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

What can the operator do when encountering arc blow with 7018 on 16-ga. mild steel in a flat fillet weld?

a. Change travel speed

b. Shorten arc gap

c. Increase amperage

d. All of the above

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....
18. | H5 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

The arc gap should be held to within 1/16" of the puddle on 16-ga. metal.

a. True

b. False

....
19. | H5 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

In downhill welding on 16-ga. metal, the electrode should be directed away from the edge of a lap joint.

a. True

b. False

....
20. | H5 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

Arc length is proportional to amperage in SMAW.

a. True

b. False

....
21. | H5 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

Which position is most likely to minimize burn-through?

a. Flat

b. Down vertical

c. Overhead

d. Up vertical

....

22. | H5 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

Which position is most successfully used in the welding of 16-ga. mild steel with E6011?

a. Flat

b. Down vertical

c. Up vertical

d. Overhead

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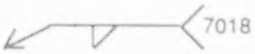
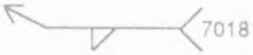
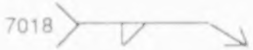
23. | H6 | d | IML Mod. 4 | 0889 | C | J.C. Niday | ART

Which welding symbol is used to show a weld in the 3F position, 7018 electrode on 16-ga.?

a. 

b. 

c. 

d. Any of the above

....
24. | H7 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

When welding in the overhead position, the electrode angle is different for 16-ga. metal than for plate.

a. True

b. False

....
25. | H7 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

The arc gap should be wider when welding 16-ga. metal in the 4G position than when welding in other positions.

a. True

b. False

....
26. | H7 | d | IML Mod. 4 | 0889 | C | J.C. Niday |

Which method is used to inspect overhead fillet welds on 16-ga. metal?

a. Bend test

b. Magnetic particle

c. X-ray

d. Visual

....

27. | H8 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

The operator needs more skill to use the smaller-diameter electrodes in arc welding.

a. True

b. False

....

28. | H8 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

How likely is burn-through when using a small electrode compared with using a large electrode?

a. More likely

b. Less likely

c. Impossible

d. Probable

....

29. | H8 | d | IML Mod. 4 | 0889 | C | J.C. Niday |

What should be done when excessive arc blow occurs?

a. Reduce amperage

b. Reduce arc gap

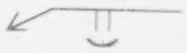
c. Change type of polarity

d. All of the above

....

30. | H9 | a | IML Mod. 4 | 0889 | C | J.C. Niday
| ART

Which is the welding symbol used for a square groove joint?



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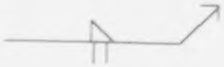

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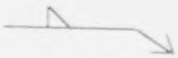
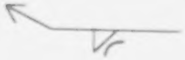


c.



d.

....

31. | H9 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

What should the travel speed be when welding overhead square groove joints?

a. Similar to flat position

b. Slower than flat position

c. Faster than vertical down

d. Slower than vertical up

....

32. | H9 | a | IML Mod. 4 | 0889 | C | J.C. Niday |

How does the electrode size used when welding an overhead square butt compare with the electrode size used when welding in the flat position?

a. Same

b. Larger

c. Smaller

d. None of the above

....
33. | H10 | a | IML Mod. 4 | 0889 | C | J.C. Niday
|

What is the joint design and position abbreviation when welding a square groove joint in the flat position?

a. 1G

b. 2G

c. 1F

d. 2F

....
34. | H10 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

What polarity is best used with E7018 electrodes?

a. AC

b. DCRP

c. DCSP

d. All of the above

....
35. | H10 | d | IML Mod. 4 | 0889 | C | J.C. Niday
|

What is the benefit of using the correct travel speed in welding?

a. Proper penetration

b. Good appearance of bead

c. Good appearance of puddle

d. All of the above

....
36. | H11 | a | IML Mod. 4 | 0889 | C | J.C. Niday
|

Welding techniques for 14-gauge and 18-gauge mild steel are very similar.

a. True

b. False

....
37. | H11 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding a butt joint on 16-ga. in the horizontal position, where should the arc be directed?

a. Lower side of joint

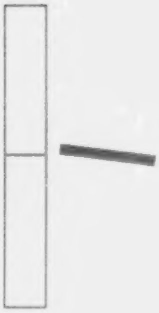
b. Upper side of joint

c. Center of the joint

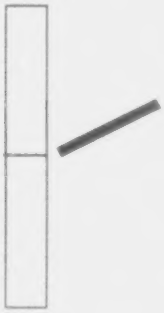
d. None of the above

....
38. | H11 | c | IML Mod. 4 | 0889 | C | J.C. Niday
| ART

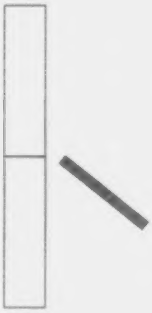
Which drawing shows the correct electrode angle for the horizontal position on 16-gauge?



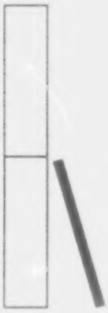
a.



b.



c.



d.

....

39. | H11 | c | IML Mod. 4 | 0889 | C | J.C. Niday |

What is the abbreviation for a horizontal square groove joint?

a. 2F

b. 3F

c. 2G

d. 3G

....
40. | H12 | b | IML Mod. 4 | 0889 | C | J.C. Niday |

The electrode angle used when welding with 7018 will be much different than with 6011.

a. True

b. False

....
41. | H12 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

What polarity is usually used with 7018 and a 16-ga. horizontal square groove joint?

a. AC

b. DCRP

c. DCSP

d. ACHF

....
42. | H12 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

What is the correct amperage when using 3/32" 7018 on 16-gauge in the horizontal position?

a. 30-50

b. 50-100

c. 100-125

d. 125-150

....

43. | H12 | a | IML Mod. 4 | 0889 | C | J.C. Niday
|

When using 7018 on a horizontal square groove, how does arc gap compare with 6011 gap?

a. Closer

b. Wider

c. Same

d. None of the above

....
44. | H13 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

Which common polarity should be used when welding 16-ga. mild steel with 6010 and 6011?

a. AC

b. DCRP

c. DCSP

d. ACHF

....
45. | H13 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding down-vertical on 16-gauge with 6010 or 6011, what can NOT be prevented by a slight whipping motion?

a. Undercut

b. Melt through

c. Burn-through

d. Slag holes

....
46. | H13 | c | IML Mod. 4 | 0889 | C | J.C. Niday
|

What test method is used when inspecting completed welds on 16-gauge, down vertical, and 6010-6011?

a. X-ray

b. Magnetic particle

c. Visual

d. Bend test

Field	Contents
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8	Accompanying artwork (ART)

....

47. | H13 | d | IML Mod. 4 | 0889 | C | J.C. Niday |

When welding 16-ga. sheet metal in the vertical position, how should the weld progress?

a. Left to right

b. Right to left

c. Bottom to top

d. Top to bottom

....
48. | H15 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding unequal thicknesses of metal in the overhead position, where should the electrode be concentrated?

a. Thin side

b. Thick side

c. Center of joint

d. Any of the above

....
49. | H15 | d | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding a square butt, 16-ga. joint in the overhead position, which describes a proper arc gap?

a. 1/4"

b. 3/16"

c. 1/8"

d. 1/16"

....
50. | H15 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding in the overhead position on 16-gauge with 6010-6011, what is the proper electrode angle?

a. Horizontal

b. Pushed

c. Vertical

d. Pulled

....
51. | H15 | d | IML Mod. 4 | 0889 | C | J.C. Niday
|

What does "dragging" the electrode mean?

a. Pulling with no arc gap

b. Pushing with no arc gap

c. Vertical angle with no arc gap

d. Pulling and slightly touching the coating

....
52. | H15 | c | IML Mod. 4 | 0889 | C | J.C. Niday
|

How many beads are required on an overhead square groove weld on 16 gauge?

a. 3

b. 2

c. 1

d. None of the above

....
53. | H15-16 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

How is the arc gap described on 16-ga. mild steel in the overhead position?

a. Wider than in the flat position

b. Shorter than in the flat position

c. Same as in the flat position

d. None of the above

....

54. | H15-16 | d | IML Mod. 4 | 0889 | C | J.C. Niday
|

When encountering arc blow in welding overhead square groove joints, what change should be made?

a. Polarity

b. Travel in opposite direction

c. Amperage reduced

d. All of the above

....

55. | H16 | a | IML Mod. 4 | 0889 | C | J.C. Niday
|

What is the degree of difficulty when welding 16-gauge in the overhead position with 7018 welding rod?

a. Most difficult

b. Easier than horizontal

c. Easier than flat

d. More difficult than horizontal

....

56. | H16 | c | IML Mod. 4 | 0889 | C | J.C. Niday
|

Which inspection method is usually used with a square groove joint on 16-gauge in the overhead position with 7018 welding rod?

a. Radiographic

b. Dye penetrant

c. Visual

d. All of the above

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....

57. | H16 | c | IML Mod. 4 | 0889 | C | J.C. Niday
|

Which machine is most appropriate when welding 16-ga. mild steel in the overhead position using 7018 welding rod?

a. GTAW

b. GMAW

c. SMAW

d. SAW

....

58. | H16 | d | IML Mod. 4 | 0889 | C | J.C. Niday
|

Which is the abbreviation used for overhead position, 16-ga. mild steel, and square groove joint?

a. 1G

b. 2G

c. 3G

d. 4G

....

59. | H16 | b | IML Mod. 4 | 0889 | C | J.C. Niday
|

When welding 16-ga. mild steel with 7018 in the overhead position, what electrode size is most commonly used?

a. 1/8"

b. 3/32"

c. 1/16"

d. 5/32"

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....
1. | I1 | d | Sacks | 0889 | C | Glen Seifert |

What is the proper procedure for working on a welding machine?

a. Wear rubber gloves

b. Stand on a wooden pallet

c. Turn the welding machine off

d. Shut off the main power source

....
2. | I1 | a | Sacks | 0889 | C | Glen Seifert |

How often should power cables be checked?

a. Daily

b. Weekly

c. Bi-weekly

d. Once a month

....
3. | I1 | c | Sacks | 0889 | C | Glen Seifert |

Why is proper ventilation of a welding shop important?

a. Keeps work area cool

b. Removes odors

c. Removes toxic fumes

d. Circulator air

....

4. | I1 | c | Sacks | 0889 | C | Glen Seifert |

What is the lightest shade of lens to be used for MIG welding?

a. #4

b. #5

c. #9

d. #12

....

5. | I1 | b | Sacks | 0889 | C | Glen Seifert |

Safety glasses are NOT needed when working with electrode wire.

a. True

b. False

....

6. | I1 | b | Sacks | 0889 | C | Glen Seifert |

To check the electrode feeder, place a finger over the end of the contact tip.

a. True

b. False

....

7. | I1 | a | Sacks | 0889 | C | Glen Seifert |

A welder should never look into a welding gun while feeding electrode wire.

a. True

b. False

....

8. | I2 | a | Sacks | 0889 | C | Glen Seifert |

Spray transfer provides a rapid deposition of weld metal.

a. True

b. False

....

9. | I2 | b | Sacks | 0889 | C | Glen Seifert |

Short-circuit transfer has more penetration and a greater fluid puddle than spray transfer.

a. True

b. False

....

10. | I2 | c | VICA | 0889 | C | Glen Seifert |

To get the same amount of shielding, what is the ratio of helium flow rate to argon flow rate?

a. 1:2

b. Equal

c. 2:1

d. 1.75:1

....

11. | I2 | c | VICA | 0889 | C | Glen Seifert |

Inert gas is regulated through a flow meter which uses what kind of measurement?

a. Inches

b. PSI

c. Cubic feet per hour

d. None of the above

....

12. | I2 | b | VICA | 0889 | C | Glen Seifert |

What may happen to the flow meter if too much carbon dioxide gas is used?

a. Spring a leak in the line

b. Freeze

c. Blow a hole in the diaphragm

d. Break the plastic tube

....

13. | I2 | b | VICA | 0889 | C | Glen Seifert |

Of the choices below, what is the most common gas used with GMAW on steel?

a. Argon

b. Carbon dioxide

c. Helium

d. Hydrogen

....

14. | I2 | b | VICA | 0889 | C | Glen Seifert |

In submerged arc welding, a shielding gas is used in the same way as in regular MIG welding (GMAW).

a. True

b. False

....

15. | I2 | a | VICA | 0889 | C | Glen Seifert |

What forms on an aluminum weld when insufficient shielding gas is used?

a. Black coating

b. Pink color

c. Oxide

d. Green coating

....

16. | I2 | b | Sacks | 0889 | C | Glen Seifert |

How should gas cylinders be stored?

a. In work area

b. Capped and chained

c. Stored together

d. Laying down

....
17. | I2 | b | Sacks | 0889 | C | Glen Seifert |

What shielding gas is the best for out-of-position GMAW on carbon steel?

a. 95/5

b. 75/25

c. Argon

d. Carbon dioxide

....
18. | I2 | a | Sacks | 0889 | C | Glen Seifert |

Gas cylinder bottles should be chained while in use.

a. True

b. False

....
19. | I2 | b | Sacks | 0889 | C | Glen Seifert |

95/5 gas contains 95 percent oxygen and 5 percent argon.

a. True

b. False

....
20. | I2 | b | Sacks | 0889 | C | Glen Seifert |

During which welding operation does the spray-arc process provide a fast deposition rate?

a. Vertical and overhead

b. Aluminum

c. Cast iron

d. Light-gauge metal

....
21. | I2 | a | Sacks | 0889 | C | Glen Seifert |

Why should a cylinder bottle have the valve cracked open before installing a gauge?

a. To remove dust from valve

b. To check valve

c. To check if bottle is full

d. To see if valve will shut off

....
22. | I2 | b | VICA | 0889 | C | Glen Seifert |

Spray transfer requires a lower current density than short-circuit transfer.

a. True

b. False

....
23. | I2 | b | VICA | 0889 | C | Glen Seifert |

Straight helium or a mixture of helium and another gas is the recommended shield for welding non-ferrous metals.

a. True

b. False

....

24. | I2 | b | VICA | 0889 | C | Glen Seifert |

When carbon dioxide is used as a shielding gas, the arc tends to be more stable.

a. True

b. False

....

25. | I2 | a | VICA | 0889 | C | Glen Seifert |

The shielding gas used for internal purging and external pipe welding should be the same.

a. True

b. False

....

26. | I3 | a | VICA | 0889 | C | Glen Seifert |

When welding pipe outdoors, a higher gas flow for shielding purposes is often necessary.

a. True

b. False

....

27. | I3 | a | VICA | 0889 | C | Glen Seifert |

If the flow of shielding gas is correct for the welding operation involved, there will be a uniform arc sound.

a. True

b. False

....

28. | I3 | b | VICA | 0889 | C | Glen Seifert |

In a constant-potential power supply unit, there is an automatic adjustment of current when the wire is fed faster.

a. True

b. False

....

29. | I3 | a | VICA | 0889 | C | Glen Seifert |

Deeper penetration in MIG welding GMAW can be achieved by increasing the welding current and by using a shorter wire stick-out or smaller diameter wire.

a. True

b. False

....
30. | I3 | b | Sacks | 0889 | C | Glen Seifert |

What is the most commonly used current in the MIG welding process?

a. DCSP

b. DCRP

c. AC

d. None of the above

....
31. | I3 | d | Sacks | 0889 | C | Glen Seifert |

High arc voltage will give what size of weld bead?

a. Thin and shallow

b. High and narrow

c. High and wide

d. Wide and flat

....
32. | I3 | d | Sacks | 0889 | C | Glen Seifert |

How is wire speed set and checked in ipm?

a. Count turns of drive roller

b. Check number on dial

c. Read amperage gauge while welding

d. Run wire for five seconds; measure, then multiply by 12

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....

33. | I3 | a | Sacks | 0889 | C | Glen Seifert |

What is the proper gas flow for mild steel using .035 wire and carbon dioxide?

a. 20-25

b. 30-50

c. 40-60

d. 50-70

....

34. | I3 | a | VICA | 0889 | C | Glen Seifert |

For specific voltage setting, a high wire feed rate will result in an amperage increase.

a. True

b. False

....
35. | I4 | b | Sacks | 0889 | C | Glen Seifert |

Electrode wire feed rollers should be kept as tight as possible.

a. True

b. False

....
36. | I4 | a | Sacks | 0889 | C | Glen Seifert |

During the welding operation, it is good practice to keep the gun cable straight.

a. True

b. False

....
37. | I4 | b | Jeffus & Johnson | 0889 | C | Glen Seifert |

When would U-grooved electrode wire feed rollers be used?

a. On hard wire

b. On soft wire

c. With push-type rollers

d. With pull-type rollers

....
38. | I4 | d | VICA | 0889 | C | Glen Seifert |

In which position can MIG welding of aluminum be done?

a. Flat and horizontal positions

b. Flat position only

c. Flat and vertical positions

d. All positions

....

39. | I4 | a | Sacks | 0889 | C | Glen Seifert |

Select proper settings for 0.35 wire on 3/16" mild steel plate using carbon dioxide.

a. Volts 19-21; amps 110-160; gas flow 20-25

b. Volts 20-30; amps 140-180; gas flow 30-35

c. Volts 30-40; amps 170-195; gas flow 40-50

d. Volts 50-60; amps 195-210; gas flow 50-60

....

40. | I4 | c | Sacks | 0889 | C | Glen Seifert |

What is the proper gas flow for 95/5 gas using solid core wire?

a. 20-25

b. 30-40

c. 40-50

d. 50-60

....

41. | I4 | c | Sacks | 0889 | C | Glen Seifert |

Select proper amperage for 1/16" wire on mild steel plate using 95/5 gas.

a. 150-160

b. 160-200

c. 220-325

d. 300-600

....
42. | I4 | a | VICA | 0889 | C | Glen Seifert |

Regular MIG (GMAW) power supply machines are used for flux-core wire welding.

a. True

b. False

....
43. | I4 | a | VICA | 0889 | C | Glen Seifert |

In submerged arc welding, a granulated flux is deposited over the weld puddle which shields it from atmospheric contamination.

a. True

b. False

....
44. | I4 | a | VICA | 0889 | C | Glen Seifert |

MIG (GMAW) is often used for pipe welding.

a. True

b. False

....
45. | I4 | a | VICA | 0889 | C | Glen Seifert |

MIG welding (GMAW) produces deeper and narrower beads than shielded metal arc welding.

a. True

b. False

....
46. | I4 | a | VICA | 0889 | C | Glen Seifert |

Wire stick-out influences the welding current since it changes the preheating in the wire.

a. True

b. False

....
47. | I4 | d | VICA | 0889 | C | Glen Seifert |

What is used to adjust the amps on a MIG welder?

a. Flow meter

b. Gun's trigger

c. Stick-out

d. Wire feeder

....
48. | I4 | a | VICA | 0889 | C | Glen Seifert |

A MIG arc stream is sharper and more penetrating than that of the shielded metal arc.

a. True

b. False

....

49. | I4 | c | Sacks | 0889 | C | Glen Seifert |

Select proper voltage for 1/16" wire on mild steel plate using 95/5 gas.

a. 18-22

b. 23-26

c. 26-33

d. 35-40

....

50. | I5 | a | Sacks | 0889 | C | Glen Seifert |

Which wire is best suited when welding mild steel plate?

a. E70S-6

b. 4043

c. 5356

d. 309

....

51. | I5 | d | Sacks | 0889 | C | Glen Seifert |

What is the tensile strength of E70S-6 weld wire?

a. 35,000

b. 40,000

c. 60,000

d. 70,000

....

52. | I5 | a | Sacks | 0889 | C | Glen Seifert |

In the classification code for E70S-6 welding wire, the E stands for electric.

a. True

b. False

....
53. | I6 | d | Sacks | 0889 | C | Glen Seifert |

What is the proper filler rod to weld 6061 aluminum?

a. 1100

b. 5154

c. 5554

d. 4043

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....

54. | I7 | d | Sacks | 0889 | C | Glen Seifert |

Which wire is used for welding stainless steel?

a. E70-4

b. E70-6

c. 4043

d. 309

....
55. | I8 | d | Sacks | 0889 | C | Glen Seifert |

If the weld call-out says to use flux-core weld wire, which should **be used?**

a. 4043

b. E70-6

c. 309

d. E70T-6

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....

56. | I10 | a | VICA | 0889 | C | Glen Seifert |

In the flux-core wire welding process, slag is deposited over the puddle.

a. True

b. False

....
57. | I12 | a | Sacks | 0889 | C | Glen Seifert |

Flux-core arc welding is practical for overhead positions.

a. True

b. False

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....

58. | I14 | b | Sacks | 0889 | C | Glen Seifert |

What type of MIG weld bead will be produced when using the push technique?

a. Narrow, shallowly penetrated weld with slight crown

b. Wide, shallowly penetrated weld with slight crown

c. Narrow, deeply penetrated weld with high crown

d. Wide, deeply penetrated weld with high crown

....

59. | I14 | b | Sacks | 0889 | C | Glen Seifert |

Steel plate that is 1/4" and thicker need NOT be beveled for butt weldments.

a. True

b. False

....
60. | I15 | a | VICA | 0889 | C | Glen Seifert |

The use of copper back-up blocks is often advisable when welding thin-gauged aluminum.

a. True

b. False

....
61. | I15 | b | Sacks | 0889 | C | Glen Seifert |

What is the preferred industry method of cleaning aluminum edges before welding?

a. Wire brush

b. Acid

c. Grinder

d. Rag and cleaner

....
62. | I15 | a | Sacks | 0889 | C | Glen Seifert |

The best wire brush to use on aluminum is a stainless steel brush.

a. True

b. False

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....

63. | I16 | b | Sacks | 0889 | C | Glen Seifert |

A regular wire brush can be used to clean stainless steel.

a. True

b. False

....
64. | I20 | b | Sacks | 0889 | C | Glen Seifert |

What is the proper heat setting for vertical and overhead welding?

a. Same as for flat welding

b. Colder than for flat welding

c. Hotter than for flat welding

d. None of the above

65. | I25 | b | VICA | 0889 | C | Glen Seifert |

Back-up blocks are never needed in MIG welding (GMAW).

a. True

b. False

....
66. | I28 | a | Sacks | 0889 | C | Glen Seifert |

How should the travel speed be adjusted to change from downhill welding to flat welding?

a. Slower

b. Faster

c. Same

d. None of the above

....
67. | I28 | d | Sacks | 0889 | C | Glen Seifert |

What is the maximum thickness of carbon steel that should be welded downhill?

a. 11-gauge

b. 12-gauge

c. 16-gauge

d. 3/16"

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[illegible]	**Source (author, year of publication)**	8	Accompanying artwork (ART)

....
68. | I29, I30 | b | VICA | 0889 | C | Glen Seifert
|

A root pass is NOT required for MIG pipe welding.

a. True

b. False

....
69. | I29, I30 | b | VICA | 0889 | C | Glen Seifert
|

No weaving motion for filler passes is necessary when welding pipe with MIG (GMAW).

a. True

b. False

....
70. | I32 | b | Sacks | 0889 | C | Glen Seifert |

When welding a square butt joint of 1/8" or larger, no root opening or beveling is required.

a. True

b. False

....
71. | I32 | b | Sacks | 0889 | C | Glen Seifert |

Improper welding gun angle will NOT cause undercutting.

a. True

b. False

....
72. | I32 | b | Sacks | 0889 | C | Glen Seifert |

High voltage setting will NOT cause undercutting.

a. True

b. False

....
73. | I32 | b | Sacks | 0889 | C | Glen Seifert |

Improper amperage in GMAW will NOT cause undercutting.

a. True

b. False

....

74. | I32 | a | Sacks | 0889 | C | Glen Seifert |

Undercutting is a concern when welding in all positions with the GMAW process.

a. True

b. False

....

75. | I32 | d | Sacks | 0889 | C | Glen Seifert |

What can cause porosity in MIG welding?

a. Dirty nozzle

b. Improper gas pressure

c. Wind

d. All of the above

....

76. | I32 | b | Sacks | 0889 | C | Glen Seifert |

High setting of gas pressure will NOT harm a weld.

a. True

b. False

....
77. | I32 | d | Sacks | 0889 | C | Glen Seifert |

What causes cold lap on a weld's leg?

a. Travel speed too slow

b. Improper heat setting

c. Gun angle

d. All of the above

....
78. | I32 | a | Sacks | 0889 | C | Glen Seifert |

Undercutting results when the voltage heat setting is set too high.

a. True

b. False

....
79. | I32 | c | Sacks | 0889 | C | Glen Seifert |

If the wire feed is uneven and has a slight vibration, what is the first thing to check?

a. Wire feed tension

b. Adjustment on spool

c. Contact tip

d. Gas flow

....
80. | I32 | c | Sacks | 0889 | C | Glen Seifert |

After the tip has been checked, the wire feed is still uneven and has a slight vibration. What is the second item to check?

a. Liner

b. Drive rolls

c. Wire feed tension

d. Gas flow

....
81. | I32 | b | Sacks | 0889 | C | Glen Seifert |

Wire guides (in a wire-feed system) will NOT cause wire feed problems.

a. True

b. False

....
82. | I32 | a | Sacks | 0889 | C | Glen Seifert |

A dirty liner in a welding wire feed system can cause wire feed problems.

a. True

b. False

....
83. | I32 | a | VICA | 0889 | C | Glen Seifert |

A square butt joint is usually satisfactory for most thin metal sections.

a. True

b. False

....
84. | I32 | a | VICA | 0889 | C | Glen Seifert |

Most joints designed for GMAW have a narrower beveled angle than those designed for SMAW.

a. True

b. False

....
85. | I32 | a | VICA | 0889 | C | Glen Seifert |

What is the cause of whiskers with GMAW?

a. Burn-through

b. Low voltage

c. Shielding gas

d. Wrong polarity

....
86. | I32 | a | VICA | 0889 | C | Glen Seifert |

Backing rings on pipe are sometimes used to prevent burn-through.

a. True

b. False

....

87. | I33 | a | VICA | 0889 | C | Glen Seifert |

Critical pipe welds must pass rigid X-ray inspections.

a. True

b. False

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....
1. | J1 | d | IML Mod. 6 | 0889 | C | Tom McLaughlin
|

Which is NOT a safety concern in GTAW?

a. Infrared rays

b. Electrical shock

c. Ultraviolet rays

d. No filler rod

....
2. | J1 | a | Sacks | 0889 | C | Tom McLaughlin |

High temperature and high humidity increase the chance of electric shock in GTAW.

a. True

b. False

....
3. | J1 | a | Sacks | 0889 | C | Tom McLaughlin |

The inert gases helium and argon are mixed for use in TIG welding.

a. True

b. False

....
4. | J2 | b | Sacks | 0889 | C | Glen Seifert |

DCRP is recommended for normal TIG welding of aluminum.

a. True

b. False

....
5. | J2 | b | IML Mod. 6 | 0889 | C | Harry Batz |

What is the advantage of a pulse setting on a GTAW machine?

a. Standard GTAW machine equipment

b. Minimum distortion and better welds

c. Maximum heat input

d. Sets on/off pattern in timed segments

....
6. | J2 | b | IML Mod. 6 | 0889 | C | Harry Batz |

Which type of gas nozzle is most commonly used?

a. Metal

b. Ceramic

c. Pyrex

d. Alumina

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....

7. | J2 | d | IML Mod. 6 | 0889 | C | Harry Batz |

Which gas cup is clear glass?

a. Metal

b. Ceramic

c. Alumina

d. Pyrex

....

8. | J2 | b | IML Mod. 6 | 0889 | C | Harry Batz |

Which gas cup has high-impact resistance and long life?

a. Pyrex

b. Alumina

c. Ceramic

d. Metal

....

9. | J2 | b | IML Mod. 6 | 0889 | C | Harry Batz |

What is the advantage of using GTAW?

a. Only light slag and spatter are produced

b. Operator has close control of welding process

c. It's good for thick or large weldments.

d. The arc and weld puddle don't need to be watched closely.

....
10. | J2 | a | VICA | 0889 | C | Tom McLaughlin |

What function does the tungsten perform in gas tungsten arc welding?

a. Conducts weld current to the work

b. Forms the bead

c. Cleans the metal

d. All of the above

....
11. | J2 | a | VICA | 0889 | C | Tom McLaughlin |

Most ferrous metals are GTAW (TIG) welded with DCSP current because better welds can be made with deeper penetration.

a. True

b. False

....
12. | J2 | c | Sacks | 0889 | C | Tom McLaughlin |

When does the TIG torch require a water circulator?

a. When cleaning the base metal

b. When the tungsten turns black

c. When welding heavy aluminum

d. Never

....

13. | J2 | b | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

Which torch is most efficient in removing excess heat in GTAW?

a. Plasma

b. Water-cooled

c. Air-cooled

d. Acetylene

....

14. | J2 | b | VICA | 0889 | C | Tom McLaughlin |

For fabricating quality aluminum patio furniture, what is the best welding process to use?

a. GMAW

b. GTAW

c. OAW

d. SMAW

....

15. | J2 | a | VICA | 0889 | C | Tom McLaughlin |

DC straight-polarity current should be used for TIG welding of low-carbon steel.

a. True

b. False

....
16. | J2 | d | VICA | 0889 | C | Tom McLaughlin |

For what amperages is a water-cooled torch needed?

a. 25-50

b. 50-75

c. 75-100

d. 100-250

....
17. | J2 | c | VICA | 0889 | C | Tom McLaughlin |

The techniques used to weld aluminum will work equally well with what other alloy?

a. Copper

b. Stainless steel

c. Magnesium

d. All of the above

....
18. | J2 | d | VICA | 0889 | C | Tom McLaughlin |

What does TIG stand for?

a. Tungsten

b. Gas

c. Inert

d. All of the above

....
19. | J3 | a | Sacks | 0889 | C | Tom McLaughlin
|

Which shielding gas is most commonly used for TIG welding aluminum?

a. Argon

b. Carbon dioxide

c. Hydrogen

d. Nitrogen

....
20. | J3 | a | Sacks | 0889 | C | Tom McLaughlin |

Nitrogen can be used to weld deoxidized copper.

a. True

b. False

....
21. | J3 | d | Sacks | 0889 | C | Tom McLaughlin |

Which is done for shielding gas cylinder safety?

a. Cylinder marked MT when empty

b. Valve closed and capped

c. Cylinder secured in upright position

d. All of the above

....

22. | J3 | a | Sacks | 0889 | C | Tom McLaughlin |

The elements in the air that cause the most contamination of welds are oxygen, nitrogen and hydroden.

a. True

b. False

....

23. | J3 | d | IML Mod. 6 | 0889 | C | Harry Batz |

What are some limitations of GTAW?

a. Gas shield bothered by wind and drafts

b. Low weld metal deposition rate

c. Slower welding speeds

d. All of the above

e. None of the above

....

24. | J3 | a | Kennedy | 0889 | C | Tom McLaughlin |

A weld specimen is cut into coupons for testing.

a. True

b. False

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....

25. | J4 | a | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

Shielding the arc area from oxygen in TIG welding is essential.

a. True

b. False

....

26. | J4 | d | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

Adding thoria or zirconia in small quantities improves which of the following?

a. Arc starting

b. Current capacity

c. Resistance to contamination

d. All of the above

....

27. | J4 | a | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

Which is NOT a common cause of tungsten electrode contamination?

a. Filler rod touches weld pool

b. Weld pool touches electrode

c. Amperage setting too high

d. Flow rate of shielding gas too low

....

28. | J4 | d | VICA | 0889 | C | Tom McLaughlin |

What two electrodes are considered non-consumable?

a. Carbon and copper

b. Tungsten and copper

c. Tungsten and chromium

d. Tungsten and carbon

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....

29. | J5 | a | VICA | 0889 | C | Tom McLaughlin |

The gas cup on a TIG torch controls the distribution of the shielding gas.

a. True

b. False

....

30. | J5 | a | VICA | 0889 | C | Tom McLaughlin |

Once a puddle is formed in TIG welding, the puddle is usually advanced without any circular torch motion.

a. True

b. False

....

31. | J5 | b | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

When welding copper with TIG, which mixture of shielding gas is used?

a. Argon and helium

b. Argon and nitrogen

c. Argon and oxygen

d. Argon and hydrogen

....
32. | J5 | c | Sacks | 0889 | C | Tom McLaughlin |

To prevent contaminating the gas, what material is used to make shielding gas hoses?

a. Copper

b. Steel

c. Plastic

d. Rubber

....
33. | J5 | a | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

What is the result of high gas-flow rates in TIG welding?

a. Turbulence and poor puddle shielding

b. Prevention of arc blow

c. Protection of the weld

d. Reduction in oxide contamination

....
34. | J5 | d | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

Which is NOT a cause of contamination in GTAW?

a. Gloves

b. Dirty base metal

c. Oxidized filler rod

d. HAZ (Heat Affected Zone)

157

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....

35. | J5 | b | VICA | 0889 | C | Tom McLaughlin |

For TIG welding heavy sections of low-alloy steel, what shielding gas mixture should be used?

a. 35% helium, 65% carbon dioxide

b. 75% helium, 25% argon

c. 75% argon, 25% carbon dioxide

d. 50% argon, 50% carbon dioxide

....

36. | J5 | c | VICA | 0889 | C | Tom McLaughlin |

What inert gases are used most often during TIG welding?

a. Hydrogen and ethylene dioxide

b. Carbon dioxide and nitrogen

c. Argon and helium

d. Oxygen and acetylene

....

37. | J5 | a | VICA | 0889 | C | Tom McLaughlin |

As a general rule, the gas flow rate for welding aluminum with TIG should be somewhat greater than that for welding mild steel.

a. True

b. False

....
38. | J5 | b | VICA | 0889 | C | Tom McLaughlin |

The tungsten electrode for ACHF TIG aluminum welding should have a sharp point.

a. True

b. False

....
39. | J5 | a | VICA | 0889 | C | Tom McLaughlin |

ACHF has better cleaning action for removing oxide on aluminum than DCSP.

a. True

b. False

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....

40. | J6 | e | Jeffus & Johnson | 0889 | C | Tom McLaughlin |

What methods are used to clean the base metal for GTAW?

a. File

b. Machining

c. Steel wire brush

d. Stainless wire brush

e. All of the above

....

41. | J6 | e | Cary | 0889 | C | Tom McLaughlin |

What effect do aluminum oxides have on weldability?

a. Slows the melting rate

b. Prevents metal from flowing together

c. Causes hydrogen cracking

d. Reduces ductility

e. All of the above

....

42. | J6 | a | Sacks | 0889 | C | Tom McLaughlin |

When TIG welding non-ferrous metals, backing can be used for thin sections.

a. True

b. False

....

43. | J6 | d | Sacks | 0889 | C | Tom McLaughlin |

Which joint design works best under severe load?

a. Single lap

b. Edge

c. Double lap

d. Butt

....

44. | J7 | a | VICA | 0889 | C | Tom McLaughlin |

For practice TIG welds on low-alloy steel, what type of filler rod should be used?

a. Mild steel

b. Thoriated-tungsten

c. Copper coated

d. Stainless steel

....

45. | J7 | a | VICA | 0889 | C | Tom McLaughlin |

Which type of electrode is used mainly for X-ray quality when welding aluminum?

a. Zirconium tungsten

b. Thoriated tungsten

c. Flux-cored tungsten

d. All of the above

....

46. | J7 | b | Cary | 0889 | C | Tom McLaughlin |

What is the correct filler rod to TIG weld 3000 series aluminum?

a. Al-1100

b. Al-4043

c. Al-5052

d. Al-5356

....
47. | J7 | c | Cary | 0889 | C | Tom McLaughlin |

What is the chemical reaction of carbon with chromium called?

a. Extra low carbon

b. Columbium carbide

c. Carbide precipitation

d. Chromium

....
48. | J7 | b | Cary | 0889 | C | Tom McLaughlin |

Base metal of 201 to 308 stainless can be welded with R316 filler.

a. True

b. False

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....

49. | J8 | a | Sacks | 0889 | C | Tom McLaughlin |

In TIG welding, stringer beads can be run with and without filler rod.

a. True

b. False

....

50. | J8 | c | Sacks | 0889 | C | Tom McLaughlin |

What kind of weld is used to build pads in TIG welding?

a. Fillet

b. Groove

c. Bead

d. Plug

....

51. | J8 | b | Sacks | 0889 | C | Tom McLaughlin |

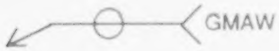
For pad-making in TIG welding, the torch angle remains the same regardless of position.

a. True

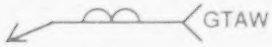
b. False

....
52. | J8 | c | Sacks | 0889 | C | Tom McLaughlin | ART

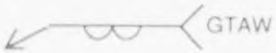
What is the welding symbol for a pad of beads in TIG welding?



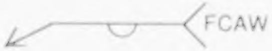
a.



b.



c.



d.

....
53. | J8 | a | Sacks | 0889 | C | Tom McLaughlin
|

The torch angle for pad building in the flat position in TIG welding is 75 degrees for the surface.

a. True

b. False

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....

54. | J9 | a | Sacks | 0889 | C | Tom McLaughlin |

What is the torch angle for horizontal TIG welding on a T-joint?

a. 45 degrees

b. 55 degrees

c. 75 degrees

d. 85 degrees

....

55. | J9 | b | Sacks | 0889 | C | Tom McLaughlin |

What produces beads that are smooth and even in TIG welding in the horizontal position?

a. High current

b. Uniform speed

c. Fast feed of filler

d. None of the above

....

56. | J9 | b | Sacks | 0889 | C | Tom McLaughlin |

With AC high-frequency start in TIG welding, the electrode touches the base metal.

a. True

b. False

....
57. | J9 | c | Sacks | 0889 | C | Tom McLaughlin |

In horizontal TIG welding, what determines the electrode's extension beyond the cup?

a. Type of metal and position

b. Type of metal and current

c. Shape and type of joint

d. None of the above

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....
58. | J10 | b | Sacks | 0889 | C | Tom McLaughlin
|

The torch angle for TIG horizontal and vertical bead welding are the same.

a. True

b. False

....
59. | J10 | a | Sacks | 0889 | C | Tom McLaughlin
|

What is the torch angle for TIG bead welding in the vertical position?

a. 45 degrees

b. 60 degrees

c. 75 degrees

d. 90 degrees

....
60. | J10 | c | Sacks | 0889 | C | Tom McLaughlin
|

What force must be overcome in vertical TIG bead welding?

a. Arc blow

b. Surface tension of puddle

c. Gravity

d. Arc force

```
..........
61.  | J10     | a  | Sacks    | 0889    | C  | Tom McLaughlin
|
```

In vertical TIG welding, where is the filler rod added?

a. Leading edge of the puddle

b. Middle of the puddle

c. Back edge of the puddle

d. None of the above

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....
62. | J11 | a | Sacks | 0889 | C | Tom McLaughlin
|

What is the torch angle in TIG overhead welding?

a. 45 degrees in direction of welding

b. 60 degrees across bead

c. 75 degrees in direction of weld

d. 90 degrees in direction of weld

....
63. | J11 | b | Sacks | 0889 | C | Tom McLaughlin
|

What is the progression in overhead TIG welding for a right-handed welder?

a. Left to right

b. Right to left

c. Side to side

d. Away from the starting point

....
64. | J11 | d | Sacks | 0889 | C | Tom McLaughlin
|

On what does the number of passes in TIG welding depend?

a. Thickness of base metal

b. Joint design

c. Position of welding

d. All of the above

....

65. | J11 | b | Sacks | 0889 | C | Tom McLaughlin |

Overhead TIG beading on like thicknesses of aluminum, stainless steel and carbon steel requires the same current.

a. True

b. False

....

66. | J12 | a | Sacks | 0889 | C | Tom McLaughlin |

When TIG welding stainless steel, tungsten electrode sharpened to a point should be used.

a. True

b. False

....

67. | J12 | a | Sacks | 0889 | C | Tom McLaughlin |

Argon shielding gas should be used to TIG weld stainless steel in the flat position.

a. True

b. False

....

68. | J12 | a | Sacks | 0889 | C | Tom McLaughlin |

To TIG weld a stainless steel T-joint in the 1F position, how is the electrode adjusted?

a. Extended out

b. Recessed

c. Rounded

d. None of the above

....

69. | J12 | d | Sacks | 0889 | C | Tom McLaughlin
|

Where is penetration needed when TIG welding a stainless steel T-joint?

a. **At the root**

b. **At the side wall**

c. **Into base metal**

d. **All of the above**

....
70. | J13 | a | Cary | 0889 | C | Tom McLaughlin
|

In the TIG process, aluminum can be welded in all positions.

a. True

b. False

....
71. | J13 | a | Cary | 0889 | C | Tom McLaughlin
|

Argon shielding gas is used to TIG weld aluminum.

a. True

b. False

....
72. | J13 | b | Cary | 0889 | C | Tom McLaughlin
|

At what temperature (Fahrenheit) does aluminum oxide melt?

a. 1220 degrees

b. 3600 degrees

c. 5650 degrees

d. 6300 degrees

....
73. | J13 | a | Sacks | 0889 | C | Tom McLaughlin
|

What is an abbreviation for heliwelding?

a. GTAW

b. GMAW

c. SMAW

d. FCAW

....
74. | J14 | b | Sacks | 0889 | C | Tom McLaughlin
|

Copper-coated filler rod can be used to TIG weld carbon steel.

a. True

b. False

....
75. | J14 | b | Sacks | 0889 | C | Tom McLaughlin
|

What happens when the gas flow rate is too high during TIG welding of carbon steel?

a. Cracking

b. Porosity

c. Hardness

d. Scale

....
76. | J14 | a | Sacks | 0889 | C | Tom McLaughlin
|

A filler rod is NOT needed for corner, lap or edge joints that are TIG welded in carbon steel.

a. True

b. False

....
77. | J14 | a | Sacks | 0889 | C | Tom McLaughlin
|

TIG welding carbon steel in the flat position uses less argon than TIG welding aluminum.

a. **True**

b. **False**

....

78. | J15 | a | Sacks | 0889 | C | Tom McLaughlin
|

Aluminum is easier to weld in the 2F position than stainless steel.

a. True

b. False

....

79. | J15 | b | Sacks | 0889 | C | Tom McLaughlin
|

For TIG welding stainless steel in the 2F position, the torch is directed upward.

a. True

b. False

....

80. | J15 | c | Sacks | 0889 | C | Tom McLaughlin
|

Where is the filler rod added during TIG welding of stainless steel in the 2F position?

a. Center of puddle

b. Lower leading edge of puddle

c. Top leading edge of puddle

d. None of the above

....
81. | J15 | d | Cary | 0889 | C | Tom McLaughlin
|

Why is the hot end of the stainless steel filler rod kept in the shielding gas during TIG welding?

a. Prevent weld cracking

b. Prevent oxidation of filler rod

c. Prevent weld contamination

d. All of the above

....
82. | J16 | a | Sacks | 0889 | C | Tom McLaughlin
|

TIG welding of aluminum in the 2F position requires a higher amperage than for welding steel.

a. True

b. False

....
83. | J16 | a | Sacks | 0889 | C | Tom McLaughlin
|

TIG welding of aluminum in the 2F position requires an electrode with a ball-shaped tip.

a. True

b. False

....
84. | J16 | b | Sacks | 0889 | C | Tom McLaughlin
|

The correct torch angle for TIG welding aluminum in the 2F position is 60 degrees.

a. True

b. False

....
85. | J16 | a | Sacks | 0889 | C | Tom McLaughlin
|

Oxides form on aluminum at room temperature.

a. True

b. False

....
86. | J16 | c | Sacks | 0889 | C | Tom McLaughlin
|

What is true if the ball-shaped tip of the electrode remains shiny after being used in TIG welding of aluminum?

a. Too much shielding gas

b. Not enough shielding gas

c. Correct amount of shielding gas

d. None of the above

....
87. | J17 | d | Sacks | 0889 | C | Tom McLaughlin
|

What is done to correct undercutting when carbon steel is TIG welded in the 2F position?

a. Correct torch angle

b. Increase filler rod deposit

c. Lower current

d. All of the above

....
88. | J17 | b | Cary | 0889 | C | Tom McLaughlin
|

It is standard industrial practice to use the GTAW process on 1/4" carbon steel plate in the 2F position.

a. True

b. False

....
89. | J17 | d | Cary | 0889 | C | Tom McLaughlin
|

What happens if the current is too low during TIG welding of carbon steel in the horizontal position?

a. Bead too high

b. Poor penetration

c. Cold lap at edges

d. All of the above

....
90. | J17 | e | Cary | 0889 | C | Tom McLaughlin
|

What must be true of TIG welds to be of high quality?

a. Apparatus in good working order

b. Base metal must be clean

c. Proper welding technique used

d. Filler rod matches specification

e. All of the above

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....
91. | J18 | c | IML Mod. 6 | 0889 | C | Tom McLaughlin |

Which tungsten electrode is used for TIG welding stainless steel in the 3F position?

a. Pure tungsten

b. Zirconiated

c. 1% thoriated

d. None of the above

....
92. | J18 | d | Cary | 0889 | C | Tom McLaughlin |

Which TIG tungsten electrode is NOT alloyed?

a. $EwTh_2$

b. $EwTh_1$

c. EwZr

d. EwP

....
93. | J18 | c | Sacks | 0889 | C | Tom McLaughlin |

What is the standard length of tungsten electrode for manual welding?

a. 3 inches

b. 5 inches

c. 7 inches

d. 18 inches

....
94. | J18 | e | Sacks | 0889 | C | Tom McLaughlin
|

What shortens TIG electrode life?

a. Melting

b. Oxidation

c. Contamination

d. Brittleness

e. All the above

....

95. | J19 | a | Sacks | 0889 | C | Tom McLaughlin
|

What bevel angle is used to TIG weld 1/2" thick aluminum in the 3F position?

a. 30 degrees

b. 45 degrees

c. 50 degrees

d. 60 degrees

....

96. | J19 | e | Sacks | 0889 | C | Tom McLaughlin
|

What must be controlled when making fillet welds on aluminum in the vertical position?

a. Weld pool

b. Current setting

c. Weld face must be flat

d. Undercut

e. All the above

....
97. | J19 | d | Sacks | 0889 | C | Tom McLaughlin
|

How can undercutting the vertical plate be avoided when welding in the 3F position?

a. Lower welding current.

b. Use filler to provide protection.

c. Pause at the edge.

d. All the above

....
98. | J19 | d | Sacks | 0889 | C | Tom McLaughlin
|

Where is penetration needed on fillet welds of aluminum in the vertical position?

a. In the corner

b. At the notch

c. Both plates

d. All the above

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....

99. | J20 | a | Sacks | 0889 | C | Tom McLaughlin
|

AC high-frequency is NOT used in TIG welding of carbon steel in the vertical position.

a. True

b. False

....

100. | J20 | b | Sacks | 0889 | C | Tom McLaughlin
|

The TIG welding process is NOT used to weld 6" carbon steel pipe that is to be X-ray tested.

a. True

b. False

....

101. | J20 | c | Sacks | 0889 | C | Tom McLaughlin
|

Where is the 3F designation found on the welding symbol for vertical fillet weld?

a. Above the reference line

b. Below the reference line

c. In the tail

d. None of the above

....

102. | J20 | a | Certified Welder | 0889 | C | Tom McLaughlin |

A welder certified on groove welds is also certified on fillet welds in the same positions.

a. True

b. False

....

103. | J21 | a | Cary | 0889 | C | Tom McLaughlin |

Welding stainless steel in the 4F position requires more argon shielding gas than in other positions.

a. True

b. False

....

104. | J21 | b | Certified Welder | 0889 | C | Tom McLaughlin |

The AWS code for welding stainless steel in the overhead position is the same as for welding carbon steel in the overhead position.

a. True

b. False

....

105. | J21 | b | Sacks | 0889 | C | Tom McLaughlin |

R45 filler rod can be used to TIG weld stainless steel.

a. True

b. False

....

106. | J21 | a | Cary | 0889 | C | Tom McLaughlin |

The tungsten electrode is sharpened the same way for welding stainless steel and carbon steel.

a. True

b. False

....
107. | J22 | a | Cary | 0889 | C | Tom McLaughlin
|

A weaving motion of the torch is used for TIG welding aluminum in the overhead position.

a. True

b. False

....
108. | J22 | a | Cary | 0889 | C | Tom McLaughlin
|

Helium is used for TIG welding heavy aluminum in the 4F position.

a. True

b. False

....
109. | J22 | b | Sacks | 0889 | C | Tom McLaughlin
|

2024 clad aluminum that has been TIG welded overhead will pass x-ray testing.

a. True

b. False

....
110. | J22 | b | Cary | 0889 | C | Tom McLaughlin
|

Heat-treated aluminum that has been TIG welded need not be heat-treated again.

a. True

b. False

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....
111. | J23 | b | Sacks | 0889 | C | Tom McLaughlin
|

TIG welding carbon steel in the 4F position is the fastest welding process.

a. True

b. False

....
112. | J23 | b | Sacks | 0889 | C | Tom McLaughlin
|

Low-alloy steel and carbon steel are TIG welded with the same filler rod.

a. True

b. False

....
113. | J23 | a | Cary | 0889 | C | Tom McLaughlin
|

TIG welding carbon steel in the 4F position should be done with a filler rod.

a. True

b. False

....

114. | J24 | a | AWS pipe recom. | 0889 | C | Robert Williams |

How is the tungsten electrode prepared for welding square groove butt joints in the flat position?

a. Sharpen it to a point.

b. Use the tungsten without special preparation.

c. Grind the sharpened tip blunt.

d. Burn the tungsten back into a ball using DCRP polarity.

....

115. | J24 | b | Sacks | 0889 | C | Robert Williams |

The current used for welding stainless steel is DCRP.

a. True

b. False

....

116. | J24 | c | Wiley | 0889 | C | Robert Williams |

How are the weld plates placed when stainless steel is welded in the 1G position?

a. Lapped together and positioned in the flat position

b. Positioned to form a T joint

c. Butted together with a root opening

d. Butted together and welded in the vertical position

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....
117. | J24 | b | Wiley | 0889 | C | Robert Williams
|

308 grade stainless steel does NOT lose its corrosion resistance in the weld zone when it is welded with the gas tungsten arc torch.

a. True

b. False

....

118. | J25 | d | IML Mod. 6 | 0889 | C | Robert Williams |

What is the color coding of the EwZr tungsten electrode (zirconiated tungsten) used for welding aluminum?

a. Red

b. Green

c. Yellow

d. Brown

....

119. | J25 | b | Manufacturer recommendation | 0889 | C | Robert Williams |

What is avoided when the power source is set on soft start when welding in the 1G position on aluminum?

a. Cold sheets at the beginning of the weld

b. Sudden burn-back of the edges

c. Crater cracking at the beginning and ending of the weld

d. Sudden burn-back of the tungsten

....

120. | J25 | a | IML Mod. 6 | 0889 | C | Robert Williams |

What is the preferred method for welding aluminum plates in the 1G position?

a. Use a pushing technique.

b. Use the drag technique.

c. Use a whipping motion, lifting and lowering the TIG torch.

d. Use the back-step method, stopping and starting the arc frequently.

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....

121. | J25 | a | IML Mod. 6 | 0889 | C | Robert Williams |

Aluminum plates more than 3/16" thick should be beveled and notched to ensure good penetration to the root.

a. True

b. False

....

122. | J25 | b | Sacks | 0889 | C | Tom McLaughlin |

DCRP is recommended for normal TIG welding of aluminum.

a. True

b. False

....
123. | J26 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the effect of air movement around a weld area?

a. Causes unsteady torch movement

b. Cools the puddle quickly

c. Removes shielding gas from the puddle

d. Causes operator discomfort

....
124. | J26 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the benefit of separating the plates by a gap when TIG welding carbon steel 1G joints?

a. Higher build-up

b.. Better gas coverage

c. Better penetration

d. Less penetration

....
125. | J26 | d | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which of the following results in excessive melt-through when welding carbon steel on a 1G joint?

a. Excessive root opening

b. Excessive amperage

c. Inadequate travel speed

d. All the above

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....
126. | J26 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which of the following gases should be used when TIG welding carbon steel on a 1G joint?

a. Carbon dioxide

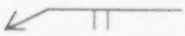
b. Argon

c. 75% argon, 25% carbon dioxide

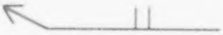
d. 98% argon, 2% oxygen

....
127. | J27 | e | IML Mod. 6 | 0889 | C | J.C. Niday
| ART

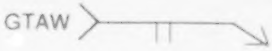
Which welding symbol indicates a 2G stainless steel joint?



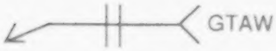
a.



b.



c.



d.

e. None of the above

....
128. | J27 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which electrode preparation is proper for welding stainless steel in a 2G joint?

a. Blunted

b. Sharpened

c. Balled

d. None of the above

....
129. | J27 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which technique commonly produces even ripples in the completed weld?

a. Proper filler rod

b. Proper torch manipulation

c. Proper gas coverage

d. Any of the above

130. | J27 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

DCRP current is required to weld stainless steel with the GTAW process.

a. True

b. False

....
131. | J28 | d | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the proper way to prepare a tungsten electrode for welding an aluminum 2G joint?

a. Broken squarely

b. Ground square

c. Sharpened

d. Balled

....
132. | J28 | a | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the proper shielding gas to use when welding an aluminum 2G joint?

a. Argon

b. Nitrogen

c. Carbon dioxide

d. Oxygen

....
133. | J28 | d | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the proper electrical polarity to use when TIG welding an aluminum 2G joint?

a. AC

b. DCSP

c. DCRP

d. ACHF

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....

134. | J28 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

Why should the aluminum filler rod be kept in the gas cloud?

a. Save energy

b. Clean plate

c. Protect filler rod

d. Minimize melt-through

....
135. | J29 | a | IML Mod. 6 | 0889 | C | J.C. Niday
|

Where should the filler rod be added to the puddle in a TIG weld of carbon steel in a 2G joint?

a. Leading edge

b. Trailing edge

c. Upper side

d. Lower side

....
136. | J29 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which abbreviation indicates the process used in TIG welding carbon steel in a 2G joint?

a. GMAW

b. SMAW

c. GTAW

d. SAW

....
137. | J29 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

At which angle is the TIG torch tipped to weld a 2G joint using carbon steel?

a. 60-75 degrees

b. 70-80 degrees

c. 80-90 degrees

d. 90-100 degrees

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....

138. | J29 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

At which angle should the filler rod be held when welding a 2G joint of carbon steel?

a. 10 degrees

b. 20 degrees

c. 30 degrees

d. 40 degrees

....
139. | J30 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

How should the tungsten electrode be prepared for welding a 3G joint in stainless steel?

a. Balled

b. Sharpened

c. Ground square

d. Blunted

....
140. | J30 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

Where should the filler rod [illegible]dded when welding a 3G joint in stainless steel?

a. Below the puddle

b. Right side of puddle

c. Above the puddle

d. Left side of puddle

....
141. | J30 | d | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which gas should be used when welding a 3G stainless steel joint?

a. Nitrogen

b. Carbon dioxide

c. Oxygen

d. Argon

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....

142. | J30 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

Which arc gap should be used when welding a stainless steel 3G joint?

a. 1/8"

b. 1/16"

c. 3/32"

d. 1/32"

....
143. | J31 | d | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the most common method of testing a 3G aluminum joint?

a. Dye penetrant

b. X-ray

c. Acid bath

d. Visual

....
144. | J31 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

Why is the torch momentarily held in place at the end of a TIG weld?

a. Cool the plate

b. Prevent puddle contamination

c. Cool the tungsten

d. Cool the filler rod

....
145. | J31 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

What tungsten electrode should be used for aluminum?

a. 1% thoriated

b. Pure tungsten

c. 2% thoriated

d. 3% thoriated

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[illegible]	Source (author, year of publication)	8	Accompanying artwork (ART)

---

146. | J31 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is best for cleaning aluminum before welding?

a. Sandpaper

b. Stainless steel wire brush

c. Carborundum grinding wheel

d. Steel wire brush

....
147. | J32 | c | AWS | 0889 | C | J.C. Niday |

What welding operation does 3G signify?

a. Horizontal groove

b. Vertical fillet

c. Vertical groove

d. Flat groove

....
148. | J32 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

What type of electrode preparation should be used for TIG welding carbon steel?

a. Balled

b. Sharpened

c. Broken

d. Ground square

....
149. | J32 | c | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the direction of travel on a 3G weld?

a. Right to left

b. Left to right

c. Bottom to top

d. Top to bottom

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....

150. | J32 | b | IML Mod. 6 | 0889 | C | J.C. Niday
|

What is the electrical current polarity when welding carbon steel in the 3G position?

a. DCRP

b. DCSP

c. AC

d. ACHF

. . . .
151. | J33 | b | VICA | 0889 | C | Tom McLaughlin
|

When a filler rod is used in TIG welding, it should be held at the same angle as the torch.

a. True

b. False

. . . .
152. | J33 | a | VICA | 0889 | C | Tom McLaughlin
|

Non-heat-treatable aluminum alloys are easier to weld with TIG than the heat-treatable types.

a. True

b. False

....
153. | J34 | b | Sacks | 0889 | C | Duane Lighthill
|

An aluminum plate (1/4 inch thick) is prepared for GTAW welding by using a grinder to remove oxides.

a. True

b. False

....
154. | J34 | c | Sacks | 0889 | C | Duane Lighthill
|

What is used to remove oxides from aluminum plate prior to testing?

a. Steel brush

b. Grinder

c. Stainless steel brush

d. File

....
155. | J34 | a | Kennedy | 0889 | C | Tom McLaughlin
|

When preparing a welded joint in stainless steel for testing, both sides of the joint should be cleaned with a grinder.

a. True

b. False

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....

1. | K2 | e | IML Mod. 8 | 0889 | C | George Rocca |

What gases can be used in plasma-arc cutting?

a. Compressed air

b. Nitrogen

c. Carbon dioxide

d. Argon

e. All of the above

....

2. | K2 | 1-ab, 2-b, 3-a, 4-d, 5-c, 6-e | IML Mod. 7 |
0889 | C | George Rocca |

Arrange the following steps in their proper order.

1. ____	Turn machine on.	a.	1st
2. ____	Connect regulators to cylinders.	b.	2nd
3. ____	Connect torch to power source.	c.	3rd
4. ____	Set regulators to required amount.	d.	4th
5. ____	Connect gas lines to cylinders.	e.	5th
6. ____	Attach ground clamp.	ab.	6th

. . . .
3. | K3 | a | IML Mod. 8 | 0889 | C | George Rocca |

To cut a straight line in a piece of metal, the plasma torch should be held against a straight-edge.

a. True

b. False

. . . .
4. | K3 | a | IML Mod. 8 | 0889 | C | George Rocca
|

After marking the line to be cut, the operator should bring the plasma-arc torch to the cutting area, lower the helmet and proceed to cut.

a. True

b. False

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....

5. | K4 | a | IML Mod. 8 | 0889 | C | George Rocca |

To make a bevel cut with a plasma-arc torch, lay the torch so the ceramic cup rests on the plate and the side of the torch is against a straight-edge.

a. True

b. False

....
6. | K5 | b | IML Mod. 8 | 0889 | C | George Rocca |

Circles greater than three inches in diameter can be cut easily manually in one motion.

a. True

b. False

....
7. | K5 | a | IML Mod. 8 | 0889 | C | George Rocca |

When a circle is to be cut, the welder should always pierce the hole on the inside of the circle if the plate is to be saved.

a. True

b. False

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. . . .

8. | K6 | a | IML Mod. 8 | 0889 | C | George Rocca |

Straight-line and circular cuts can be made free-handed or with a guide.

a. True

b. False

....

9. | K7 | a | IML Mod. 8 | 0889 | C | George Rocca |

For pipe cutting, the plasma cutting torch should be placed to get a bevel angle of 30-37.5 degrees.

a. True

b. False

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....

10. | K8 | a | IML Mod. 8 | 0889 | C | George Rocca |

After a plasma cutting operation starts, the cut should be made as far as possible with control before stopping.

a. True

b. False

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....

1. | L1 | c | experience (KC and SFCC metallurgy labs) |
0889 | C | Robert Williams |

Why must metal parts be preheated before heat-treating in molten salt?

a. Cold metal slipped into hot liquid salt takes longer to reach its transformation temperature.

b. Porosity is created in the metal as it is being heat-treated.

c. Metal with moisture will explode when dipped into hot, liquid salt.

d. After heat-treating the metal, the metal part will crack.

....

2. | L1 | b | Met. Fund. | 0889 | C | Robert Williams |

When inspecting metal in an electric furnace, students should stand in front of the door and open it very slowly.

a. True

b. False

....

3. | L1 | d | Jeffus & Johnson | 0889 | C | Robert Williams |

Which is NOT a proper safety procedure when handling grinders?

a. Wear a full face shield with safety glasses while grinding.

b. Wear gloves while operating grinding equipment.

c. When the stone wears down, adjust the tool rest to 1/16".

d. Wear long-sleeved nylon shirts to minimize burn possibility.

....

4. | L1 | b | IML Mod. 1 | 0889 | C | Robert Williams
|

The type C extinguisher is used to put out metal fires such as magnesium, zinc and titanium.

a. True

b. False

....
5. | L2 | c | IML Mod. 7 | 0889 | C | Robert Williams |

Which describes aluminum classified as 2029 AQ T6?

a. Manganese aluminum, aircraft quality, solution heat-treated, then stabilized

b. Magnesium-silicon aluminum, aircraft quality, naturally aged

c. Copper aluminum, aircraft quality, solution heat-treated, then stabilized

d. Silicon aluminum, aircraft quality, cold worked

....
6. | L2 | d | IML Mod. 7 | 0889 | C | Robert Williams |

Which is NOT a physical property of metal?

a. Density

b. Electrical conductivity

c. Thermal conductivity

d. Fatigue

....
7. | L2 | b | IML Mod. 7 | 0889 | C | Robert Williams |

Which organization developed the code for steel identification?

a. ASTM

b. AISI/SAE

c. AWS

d. API

....
8. | L2 | a | IML Mod. 7 | 0889 | C | Robert Williams |

AISI E-1020 is a low-carbon steel produced in an electric furnace.

a. True

b. False

....

9. | L3 | b | IML Mod. 7 | 0889 | C | Robert Williams |

Crayons and pellets are used to indicate precise heat treatment temperatures.

a. True

b. False

....

10. | L3 | c | Cary | 0889 | C | Robert Williams |

Why is preheating done before welding, brazing, soldering or cutting?

a. Control distortion by stopping metal from expanding

b. Control distortion by stopping metal from shrinking

c. Stop steep temperature differences that produce high stress

d. Give the metal a precise temperature so the weld metal flows faster

....

11. | L3 | a | IML Mod. 7 | 0889 | C | Robert Williams |

A torch or burner flame is commonly used to preheat metals for welding.

a. True

b. False

12. | L3 | c | Cary | 0889 | C | Robert Williams |

Why are weldments given post-weld heat treatment?

a. Annealing

b. Normalizing

c. Stress-relieving

d. Hardening

....
13. | L4 | b | Met. Fund. | 0889 | C | Robert Williams |

The cooling rate during normalizing is slower than during annealing.

a. True

b. False

....
14. | L4 | b | Met. Fund. | 0889 | C | Robert Williams |

How is metal tempered?

a. Heat above the upper transformation temperature and air cool slowly to room temperature.

b. Reheat after hardening to below the lower transformation temperature and cool to room temperature.

c. Heat above the upper transformation temperature and place in a sand or lime box.

d. Heat above the upper transformation temperature and quench in brine.

....
15. | L5 | d | IML Mod. 7 | 0889 | C | Robert Williams
|

Which is NOT an equipment requirement for spark testing?

a. Stationary or pedestal grinder

b. Medium-grit grinding wheel, such as 40-60 grit

c. Grinding wheel that has been dressed

d. Grinding wheel turning rate with very low rpm

....
16. | L5 | b | IML Mod. 7 | 0889 | C | Robert Williams
|

Which is an inappropriate way of testing properties of metal?

a. Brinell-Rockwell test for hardness

b. Izod-Charpy test for hardness

c. Shore's scleroscope test for hardness

d. Hydraulic test for tensile strength and ductility

....
17. | L5 | d | Met. Fund. | 0889 | C | Robert Williams
|

Which hardness test for metals is most commonly used in industry?

a. Brinell

b. File

c. Vickers

d. Rockwell

Field	Contents	Field	Contents
1	**Unique item number**	5	**Date** (MMYY)
2	**Duty area and task number** (Mo. competency profile)	6	**Learning domain** (Cognitive, Affective, Psychomotor)
3	**Letter of correct answer**	7	Writer(s)/reviewer(s)
4	**Source** (author, year of publication)	8	Accompanying artwork (ART)

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18. | L5 | b | IML Mod. 7 | 0889 | C | Robert Williams
|

What property of a metal is measured by a tensile tester?

a. Resistance to twisting

b. Resistance to being pulled apart

c. Withstanding a load across its cross-section

d. Resistance to being punctured

. . . .
19. | L6 | d | Met. Theory | 0889 | C | Robert Williams |

Which statement is incorrect in identifying metal by color at the grinding wheel?

a. Red--cast iron, high-speed steel or tungsten chromium steel

b. White--machine steel, carbon-tool steel, manganese steel or nitrided steel

c. Straw--stainless steel or wrought iron

d. Orange--tungsten steel or stainless steel

. . . .
20. | L6 | d | IML Mod. 7 | 0889 | C | Robert Williams
|

What is the spark volume for non-ferrous metals on the grinding wheel?

a. Small amount

b. Moderately large amount

c. Large amount

d. None

. . . .
21. | L6 | c | IML Mod. 7 | 0889 | C | Robert Williams
|

What terminology is NOT used in the spark identification test?

a. Arrow

b. Sprigs

c. Tail

d. Fork

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....
22. | L7 | a | Wiley | 0889 | C | Robert Williams |

Which is the strongest area of the tested zones?

a. Welded area

b. Grain growth area

c. Grain refinement/transition area

d. Unaffected base metal area

....
23. | L7 | b | Wiley | 0889 | C | Robert Williams |

Which of the zones has the greatest danger of cracking?

a. Unaffected base metal area

b. Area adjacent to the weld area

c. Area adjacent to the unaffected base metal

d. The completed weld

....
24. | L7 | b | Wiley | 0889 | C | Robert Williams |

The terms grain growth, grain refinement and transition zone are located in what area?

a. Weld metal zone

b. Heat affected zone

c. Unaffected base metal zone

d. Hypereutectoid zone

....
25. | L7 | a | Met. Fund. | 0889 | C | Robert Williams
|

What is the area near the weld zone called?

a. Heat affected zone or HAZ

b. Isothermal transformation zone or ITZ

c. Eutectoid transformation zone or ETZ

d. Hypoeutectoid zone or HEZ

Field	Contents	Field	Contents
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....

1. | M1 | b | Wiley | 0889 | C | Robert Williams |

The carbon arc process is a very quiet metal-removing method.

a. True

b. False

....

2. | M1 | d | Wiley | 0889 | C | Robert Williams |

How far should combustible material be from a carbon-arc cutting torch operator?

a. 5 feet

b. 10 feet

c. 20 feet

d. 35 feet

....

3. | M1 | d | Wiley | 0889 | C | Robert Williams |

Which is the noisiest thermal cutting process?

a. Oxy-acetylene

b. Electric arc

c. Plasma

d. Air-carbon arc

....
4. | M1 | a | Wiley | 0889 | C | Robert Williams |

The hazards of carbon-arc cutting are electric shock, radiation, fume and gas inhalation, noise, fire and burns.

a.   True

b.   False

....
5. | M2 | a | Wiley | 0889 | C | Robert Williams |

What should the operator do when the carbon-arc torch is hard to start or starts and stops irregularly?

a. Be sure the air is on before striking an arc.

b. Increase travel speed.

c. Increase electrode push angle.

d. Reduce travel speed.

....
6. | M2 | a | Wiley | 0889 | C | Robert Williams |

Carbon arc electrodes intended for use with A.C. current have a core of special arc-stabilizing materials.

a. True

b. False

....
7. | M2 | c | Wiley | 0889 | C | Robert Williams |

Air supply is critical for the operation of an air-carbon arc torch. What is the recommended pressure and feed rate?

a. 40-50 psi/25-30 cfm

b. 60-75 psi/70-80 cfm

c. 80-100 psi/30-35 cfm

d. 100-120 psi/40-60 cfm

....
8. | M2 | b | Wiley | 0889 | C | Robert Williams |

What is the proper lag angle for cutting with an air-carbon arc torch?

a. 20 degrees or less

b. 45 degrees or less

c. 80-85 degrees or less

d. 85-90 degrees

....
9. | M2 | b | Wiley | 0889 | C | Robert Williams |

The carbon arc torch will NOT gouge in the vertical and overhead positions.

a. True

b. False

....
10. | M2, M3 | a | Wiley | 0889 | C | Robert Williams |

When aluminum alloys are cut using the carbon-arc process, the electrode should be DC positive and the carbon arc should not extend more than four inches from the torch opening.

a. True

b. False

....
11. | M3 | d | Wiley | 0889 | C | Robert Williams |

What causes slag to adhere to the edges of a cut made with the carbon-arc torch?

a. Travel speed too slow

b. Touching carbon electrode to work

c. Unsteadiness of the operator

d. Low air pressure

....
12. | M3 | a | Wiley | 0889 | C | Robert Williams |

What should the operator do when the grooves get too deep when operating the carbon-arc torch?

a. Increase travel speed.

b. Lower air pressure.

c. Change electrode angle to 90 degrees.

d. Decrease electrode push angle and travel speed.